Fourteenth Year of Publication

Industrial FINISHING

Reg. U. S. Pat. Office

Devoted to Product Finishing in the Factory

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Letters from Readers

OF INDUSTRIAL FINISHING

These letters (and many others) were answered recently by the editorial department, but are published here to reveal certain interesting trends of desire and activity in the industry, and to encourage additional inquiries, comments and suggestions. Further information about any of them can be obtained by writing this office.—Editor.

Rotary Spray Machine

We are interested in the rotary spray finishing machine displayed in page 15 of your February issue. We should like all particulars and prices in connection with this piece of apparatus direct from the manufacturer, and we request that you forward this letter to them accordingly.—K. Mfg. Corp.

Paint Meter

In your April issue, on page 56, reference is made to a Niagara Paint Meter which was apparently described in your February issue. If you have the name and address of the manufacturer of this article we will be pleased to have same.—C. N. Co.

It's the Buffalo Meter Co., Buffalo, N. Y.—Ed.

Laboratory Table Top Finish

Frequently we receive specifications, particularly for PWA projects, for laboratory and vocational furniture for schools, specifying laboratory table tops of a substance known as "Insolite." Do you know of any such material? Also the markers of same?

The balance of the woodwork on the laboratory furniture is plain oak, school brown finish, and the specifications call for a finish that would stand tests as per the list attached.

Do you know of anyone who makes materials that would produce such a finish?—A. R. Mfg. Co.

The only "Insolite" we know of is In-So-Lite, a fire clay product of very open porous nature that is used for heat or cold insulation—a product of The Metsch Refractories Co. However this is not what A. R. Mfg. Co. wants.—Ed.

Toners; Equalizers

We are greatly interested in your article on page 66, concerning "toners or equalizers". Would you be kind enough to have the companies that manufacture this send us a pint or quart sample immediately, as we have quite a lot of work which will involve the use of same?

Also, in one of your previous issues, you made a slight mention of a joint or a crack filler that would take bleach. We would like a sample of this immediately.

Inasmuch as we are in a great hurry for both of these, won't you be kind enough to get in touch with these companies and ask them to rush samples to us?—T. T. Co. (Fine Store Equipment).

Dipping Machines

Under the title, "Dipping Machine," in INDUSTRIAL FINISHING magazine for May (page 66) there is an item of interest to us, and we are wondering if you will have The Northern Machine Mfg. Co. send us

NUOIL!!

FILLER

Never heard of before. The first *real basic* and definite improvement in Wood Filler in *twenty* years. Truly it is a *new oil* filler, and if you want the finest, best filling, easiest wiping Filler, order NUOIL. Samples on request.

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PAPER COATING
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WOOD FURNITURE

Clear Gloss.....No. 1885
Tough, practically mar-proof, heat resistant, long life.

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Competitive Lacquer having good build, good resistance to checking, rubs well.

SHELLAC SEALER—Fast drying. Hardening time of a nitrocellulose lacquer sealer with build and toughness of shellac. Sands well.

RAFFI & SWANSON, Inc., CHELSEA, MASS.

Manufacturers of INDUSTRIAL LACQUERS SINCE 1923

their literature regarding this automatic dipping machine, or will you send us their address in order that we may contact them direct?—C. V. S. Co. (Venetian Blinds).

Preserved 208 Years by Good Paint

In front of a retail tobacco store in Clarksville, Tenn., is one of the oldest and one of the most imposing "Cigar Store Indians" in the United States. The present owner, Frank Fiederling, bought this Indian at auction 57 years ago and placed him in front of his store, with the date 1881 on the base. At the time he secured authentic proof that the resplendent "Chief," with his ostrich plume headdress, had been carved from a single block of pine in 1730.

Examination of the figure reveals a hole bored downward in the block from the crown of the head. The sculptor thought it necessary to keep this holed filled with oil in order to preserve the wood and prevent cracking. Years ago this was filled with putty. It became unnecessary to put in oil because the figure was painted regularly with good paint, the oil in the paint on the surface affording perfect protection and preservation!

More than a dozen shades of brilliant paint are used in the coloring of the "Chief" (his ostrich-plummed headdress, ornamentally bordered and belted coat, leggins and beaded moccasins) and it is the work of an artist with the brush to reproduce the natural markings of the diamond rattlesnake skin on his breast and around his shoulder. The repainting of the "Chief" is a symbol for Clarksville's annual "Paint-up and Clean-up Week."—P. R. Russell.

Conveyors; Polishers

Would you be good enough to let us have manufacturers' addresses on the following items, in which we are interested:

1) Conveyor systems, as described in your article "Conveyorized Fin-

try to scratch or mar it!

Here it is—a lacquer finish that cannot be marred or scratched with the thumbnail, or other destructive agencies—a much tougher piece of goods than the ordinary lacquers. It produces a splendid transparent finish of full depth on maple, walnut, gum, mahogany and other cabinet woods. . . . It is made in either the Clear Gloss Rubbing or the Satin Finish. Mar Proof Lacquer Sealer is recommended for the first coat.

THE SCHAEFER VARNISH CO., INC.
LOUISVILLE, KY.

Used first—Makes your finish last

METALPREP

The Complete Metal Cleaner

Removes Rust

Removes Oil and Grease

Etches the Metal

Makes Paint Stay on Metal

Metalprep has been used for a number of years to prepare Iron, Steel, Aluminum, Aluminum Alloys, Galvaneal, Galvanized-iron and other alloy metals for paint finishes.

When Metalprep is used to prepare such metal products as auto bodies, buses, trailers, refrigerator and other cabinets, washing machines, etc., it increases the life of the finish since it eliminates paint failures which are due to rust, grease and improper cleaning of the metal surfaces.

WRITE FOR DETAILS.

Neilson Chemical Co.

6564 BENSON ST. DETROIT

Ahead with
NEW CROWN GUNS

NO OTHER GUN in the WORLD
has ALL the features of the
CROWN No. 20
New Controls . . . New Atomization Principle . . . New Time-Saving Features.
You'll Like It — From Start to Finish!

CROWN SPRAY GUN MFG. CO.
1216 Venice, Los Angeles, Calif.

ishing in a Furniture Factory," which appeared in May issue.

2) Sanding, rubbing and polishing machines (hand models).

3) Mechanical striping tools of other makes than—and—.—W. & W. Co. (Cabt. Makers).

Bake Finishing Birch Furniture

We are very much interested in finding a color finishing system that could be used on birch furniture—one which could be baked (to the extent that wood furniture can be baked) and which would finish up in a tough semi-gloss, elastic enough to give with minor bumps rather than crack and chip.—O. D. Corp. (Furniture Mfr.).

Blond Finishes

May we ask your advice in regard to an inquiry we have received from one of our correspondents? It reads:

"Could you give any data on the new wood finishes: Blond, bone white, silver walnut, antiquing, etc.; the materials used, the methods of applying and whatever other information is available?"

Would it be possible for you to give us any information for this inquirer?—Collier's Readers Research Bureau.

Silk Screen Decorating on Glass

In your "Letters from Readers," April 1938 issue, page 5, an inquiry is quoted concerning the use of silk-screen process on glass ware. We would like to communicate with the company and furnish them with information on our patented squeegee decorating machine for bottles and other glass ware, as well as our line of alkali-resistant glass colors used for this purpose.—O. Hommel Co.

Small Baking Outfit

We have a client in Australia who is interested in drying equipment for synthetic finishes to be used in auto refinishing shops. This equipment should be small, either in the form of lamps for drying small areas, or (it seems to us we have seen advertised in your magazine) a small oven

NOROY

(NON-ROYALTY)

WATER WHITE WOOD LACQUERS

W-1014 X GLOSS **F-1604 FLAT**

A glass hard production finish that is easy to polish. It will pay you to try our Water White Wood Lacquers.

F-1612 FULL FLAT LACQUER
22% TOTAL SOLIDS

Produces a full flat finish that does not smother the grain. Is a beautiful producton finsh that covers well and hides surface imperfections.

Send for free working samples.

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PERMACEL
THE PAPER MASKING TAPE

JONFLEX
FINE CLOTH MASKING TAPE

INDUSTRIAL
COARSE CLOTH MASKING TAPE

SEND FOR SAMPLES AND PRICES

INDUSTRIAL TAPE CORPORATION
NEW BRUNSWICK, N. J.

that would hold one car at a time for drying synthetic finishes. We would appreciate receiving any information you may have of companies manufacturing equipment of this kind.—E. H. Co. (Chemicals).

Will Waterproof a Safety Hat

We notice in your March 1938 issue of INDUSTRIAL FINISHING, on page 64, the "L. L. Co." request information relative to waterproofing the safety hat made of hard black vulcanized fiber.

We can supply these people with a material suitable for their requirements . . . . your cooperation will be very much appreciated.—The Industrial Materials Co.

Compressed Air Filter

Can you furnish us with the name of a manufacturer of spray-gun systems who would have a diatomaceous earth candle-shaped filter? —O. & E. Co. (Plumbing Fixtures).

Drying Ovens

We are contemplating the manufacture of a special line of wooden tool handles and novelties, which would require one-coat lacquer finishing, and we would appreciate your sending us, if available, a list of makers of industrial drying ovens and equipment that would be useful for this purpose.—R. S. Co. (Furniture).

Crystalline Lacquer

We would appreciate it very much if you could put us in touch with a manufacturer who makes a crystalline lacquer that can be used over painted wood surfaces.—N. A. Ltd. (Paint Mfrs.)

Painters' Supplies

We ask you to let us know the names of various manufacturers of tools and supplies for painters and paper-hangers. We know two firms, The Ridgely Trimmer Co. and The Warner Mfg. Co., who both are represented here in Sweden, but we would appreciate the names of other equal manufacturers.—A. N. & S., Malmo, Sweden.

Barrel Chain Cleaner

Please send us a descriptive circular, if possible, and prices on a 50-gal. barrel barrel-&-chain cleaner. —R. A. Co. (Paint Mfrs).

Back Copies

Will you kindly send us either a copy of the December, 1937, issue of INDUSTRIAL FINISHING, or a copy of the article on page 30, entitled "Painting Storage Batteries", and the article on page 48, entitled "External Atomizing Spray Guns"? We will appreciate receiving this information promptly.—E. E. Co. (Electric Goods).

Baked Black Crinkle

I would appreciate your informing us if there is any manufacturer that makes a crinkle black enamel or a crystalline, which will bake in 30 minutes or less. If so will you be kind enough to send them our name for samples and full information?—L. U. (Mfrs. of Photo Apparatus).

Striping Ten Pins

We are interested in finding out where we can get a device for striping ten pins, or some information as to the necessary procedure. This has been done for years, even before quick-drying lacquers and enamels came into vogue, so there must be some fairly satisfactory method of doing it.—G. F. & Son (Wood Turnings and Handles).

Salad Bowl Makers

EDITOR'S NOTE—As a result of the inquiry, "Who Will Make Wood Salad Bowls?" published on page 6 of June issue, we have received letters from several concerns advising that they are in position to make turned wood salad bowls, with and without feet.

STILLE-YOUNG PRODUCTS
From Start to Finish

Start Right!
Finish Right!

Stille-Young Products — and Stille-Young Service — This combination will help you with your Fall line. Let us hear from you at once.

The Stille-Young Corporation

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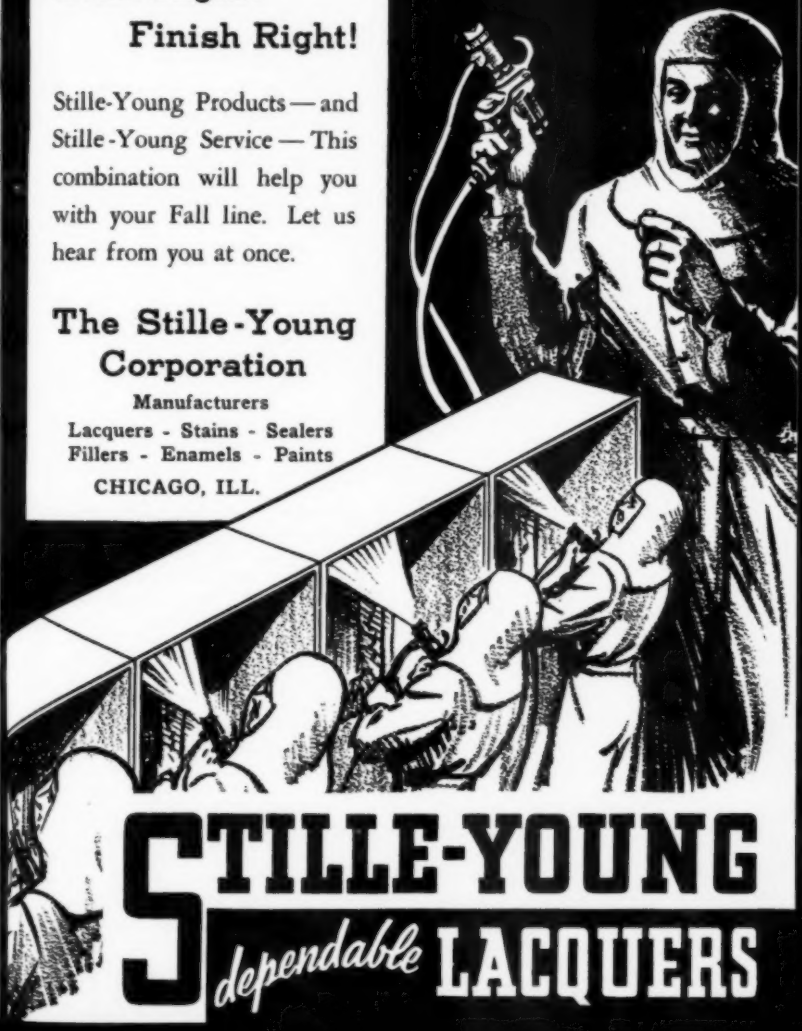
Fillers - Enamels - Paints
CHICAGO, ILL.



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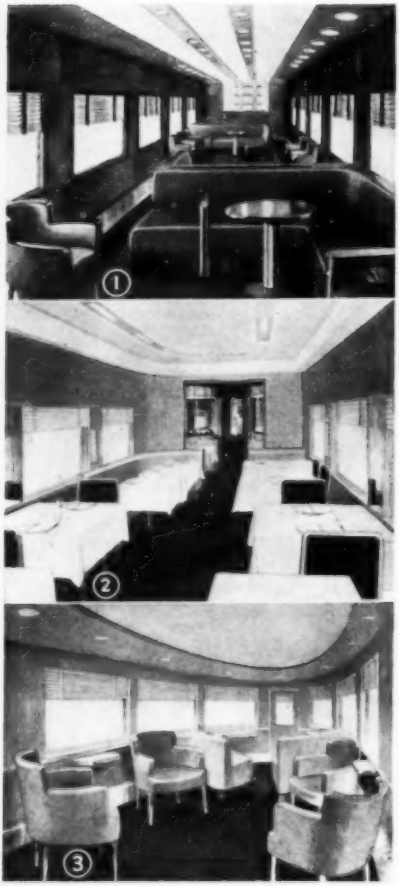
Coloring and Finishing



ON JUNE 15TH, the 36th anniversary of the world famous 20th Century Limited, the New York Central System placed in service the first fully streamlined trains to operate between New York and Chicago. Four trains, two each way, will operate on a 16-hour schedule—the fastest regular running time between America's two greatest cities.

The unique streamlining of the locomotives and the interior design and decorative treatment of the bar-lounge, the observation and dining cars, as well as the harmonizing decorations of the 44 Pullman cars, are the creation of Henry Dreyfuss, one of America's foremost industrial designers, who also designed the New York Central's first streamlined train, The Mercury, in service between Cleveland and Detroit.

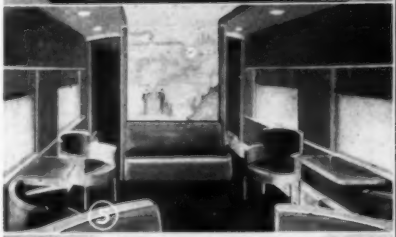
The new streamlined 20th Century Limiteds are believed to be the most modern, distinctive and luxurious equipment ever constructed for railroad service, and the first all-room trains in America.

Simplicity of color and design emphasize the dignity long associated with the 20th Century Limited. Its luxury is accentuated by rich materials and numerous innovations which offer new com-

New Streamlined Trains

forts and conveniences. While the plans, furnishings and decorations for each car vary, the simple color scheme ties the train together as a unit. From locomotive to observation car the exterior is in two tones of gray, with blue and silver stripes. Througout the interior, rust, blue, tan and gray are used in several tones and in appealing textures and finishes, complimented by the natural colors of woods, metals and leathers. These colors combine to give a restful, spacious and luxurious feeling of comfort.

In finishing these trains, nothing was spared to give them the smartest, most brilliant and lasting beauty known to modern transportation, and an elaborate finishing schedule was worked out to cover every painted surface. The following specifications are based on recommendations for finishing exteriors and interiors



1—Interior of lounge car.
2—Main dining section.
3—Observation end.
4—View in a compartment.
5—Observation lounge.
6—Main section of observation car.

Photographs and article supplied through courtesy of T. J. Maloney, Inc., New York, N. Y., advertising agency handling The Sherwin-Williams Co. account.

of one complete 20th Century Limited streamlined train:

Exteriors (Lacquer System)

1. Prepare the surfaces and prime them. Sandblast all steel surfaces and prime immediately with oil-type red oxide primer. This type provides excellent adhesion under lacquer finishing coats. Brush application of primer is recommended. For brushing, reduce primer, 25%; for spraying reduce 33 1/3% with pure spirits of turpentine.* Allow primer to dry overnight.

Prepare aluminum surfaces by sanding or steelwooling them (using fine emery cloth or fine steelwool) to provide a suitable surface for the primer coat. Clean all metal surfaces with a special chemical cleaner to be applied as recommended by the maker.

2. Over the prime-coated surfaces, brush or spray one coat of dark gray surfacer. For brushing, reduce 12½%; for spraying, reduce 25% with pure spirits of turpentine. All surface coat to dry overnight.

3. Spot putty large holes and imperfections with hard putty. Allow this putty to dry at least eight hours, depending upon the thickness of application.

4. Apply knife coat of dark gray knifing composition; allow it to dry overnight. The number of coats is optional. Some steel, because of its pitted condition, may require additional surfacer in order to produce an acceptable level surface.

5. Rub the surface smooth with pumice stone and water, or with wet-or-dry sandpaper. If water is used, allow a minimum drying-out period of eight hours.

6. Dust off car thoroughly and apply one spray coat of lacquer sealer. Reduce 112½% with lacquer thinner. Allow surface to dry two hours. Use No. 320 or 400 sandpaper for any necessary sanding.

7. 8. 9. Spray first, second and third coats of flexible railway lacquer in the train standard shade. Reduce 112½% with lacquer thinner. Allow one to two hours of drying time between coats.

10. Letter and stripe as per railway standard specifications. Where gold or aluminum leaf are used, these should be protected by pencil varnishing with two coats of a spar type finishing varnish, allowing overnight drying between coats.

The car roofs are to be given two finishing coats of quick-drying oil roof paint, allowing overnight drying between coats. A coat of lead-chromate type metal protective primer is to be applied to underframes and trucks. The latter are to receive two finishing coats of enamel; the underframes a field coat of protective paint.

The drying schedule specified is established on normal drying conditions of approximately 70°F.

Interiors (Synthetic System)

All interior metal surfaces receive the same surface preparations as exteriors. Zinc-coated metals are to be primed with a special zinc-pigmented primer; aluminum surfaces with an oil-

*Recommended percentages of reduction will vary, of course, according to the particular material being used.

type red oxide primer, and steel surfaces with a synthetic red oxide primer. Agasote and composition surfaces should receive a brush coat of a special heavy-bodied white primer to fill pores and provide maximum adhesion. The procedure for finishing steel sidewalls, bulk heads, ends, headlinings, doors, etc., is as follows:

1. Apply a thin coat of synthetic red oxide primer. Reduce 12½% for brushing; 20% with pure spirits of turpentine for spraying. Allow to dry overnight.

2. Apply a coat of cream-colored synthetic intermediate surfacer, reduced 15 to 20% with turpentine for brushing; 25% for spraying. Allow to dry overnight.

3. Spot putty with cream-colored synthetic hard putty, allowing necessary time for drying according to thickness, at least eight hours.

4. Apply a knife coat of cream-colored synthetic knifing composition. Allow this to dry overnight. Apply additional surfacing coats if the surface is so pitted as to require it.

5. Sand to a smooth surface. Allow at least eight hours of drying time if water is used. Agasote and composition surfaces are best dry sanded.

6. Apply one spray coat of flat white synthetic ground coat, reduced 12½% with turpentine. Allow overnight drying.

7, 8, 9. Apply first, second and third spray coats of synthetic railway semi-gloss enamel in the railway standard shade, reducing each coat 12½% with turpentine and allowing overnight drying between coats. The first and second coats should be mossed lightly.

10. Lay transfers and stripe in accordance with railway specifications. Allow overnight drying.

11. Pencil varnish all transfers and stripes with pale synthetic varnish. Allow overnight drying.

An additional recommendation is also given for protecting pastel shades and painted surfaces in washrooms where there is constant soap spatter, etc. These surfaces should be given a coat of pale synthetic rubbing varnish.

The entire drying schedule specified is based on normal drying conditions and a temperature of about 70°F.

Walter Wurdack, Inc., Announced as Lacquer Mfrs.

Formation of Walter Wurdack (lacquer manufacturers) 4927 Connecticut St., St. Louis, Mo., is announced. Officers include:

Walter Wurdack.....Pres. & Treas.
Sam DeRosa.....Vice President
R. O'Donnell .....Secretary

According to the announcement, the officers of the company have been associated in the manufacture and distribution of lacquer products for many years.

Raffi & Swanson's New Plant

The new plant of Raffi & Swanson, Inc. (Lacquers, Bronze Powders, Thinners), at Chelsea, Mass., occupies a land area of 70,000-sq.ft. and is served by its own railroad siding. The main building is one story high, 62-ft. wide and 307-ft. long. Quoting from the company's letter:

"With spur track facilities we can easily handle our tank car shipments. We have had to remodel practically the entire plant, and have installed considerable new equipment both from the safety factor as well as for efficiency. This gives us an opportunity to route our operations more systematically, as well as giving us ample space."

To Synthetic Finishes*

BY ED. H. BUCY
Technical Director, Zapon Division
of the Atlas Powder Company

IN THE EARLY days of industrial coatings or finishes, plain linseed oil, cooked to increase viscosity and hasten drying, was used. Coatings made in this way were very slow drying and it was impossible to get light tints or white. These coatings were poor in resistance to ultra-violet light and showed early chalking when placed on outdoor exposure.

Later it was found that cooking with some of the fossil resins such as Congo, Manilla, Pontianak and other fossil copal resins, increased the hardness and durability of the final film and speeded up the drying rate. The addition of these varnish resins to the cook gave more gloss and added materially to the adhesion of the finish. There was still bad yellowing on exposure to light, however, and the drying time was not nearly as fast as would be necessary for modern production schedules.

There weren't any noticeable improvements then until the introduction of ester gum. Ester gum, made by the reaction of rosin and glycerin, was really the first synthetic resin. When cooked with China wood oil, greatly increased speed of drying and waterproofness resulted.

Chemist's Magic Touch

Here, for the first time in the coating field, was the direct influence of the chemist. Rather than taking natural raw materials with their shortcomings, this was the first step at a synthetic or man-made fortification of the natural products.

A few years later, the development of oil-soluble phenol-aldehyde resins was the next big step. Properly cooked with oils, these new phenol-aldehyde resins produced the first so-called "4-hour enamels," and even later, the so-called "one-hour enamels." Their water resistance and chemical reagent resistance were higher than anything heretofore produced. True, a good white couldn't be made because of the discoloring influence of the phenol. However, both for paint work and for industrial finishes, the phenol-aldehyde resins showed great advances in durability and speeding up of painting schedules.

Alkyd Types Developed

Still later, the so-called alkyd types were developed. These are made by the chemical reaction of a polyhydric alcohol such as glycerin, ethylene glycol, or sorbitol,

*Copy of talk given to the American Society of Electroplaters, Feb. 28, 1938.

with an organic acid of the type such as phthallic acid, maleic acid, tartaric acid, or others. These are reacted either together or with fatty-acid modifiers. This alkyd type of resin has been used widely for refrigerator work as well as automotive and industrial finishing during the last three or four years. Much purer whites and greater durability have been made possible.

When properly baked these modified alkyd finishes resulted in much greater resistance to weathering, ultra-violet light and abrasion. The baking time, however, must be long enough to permit complete oxidation of the oil or fatty-acid modifier component. Due to the presence of the fatty acid there was after-yellowing on more prolonged exposure to light. If these finishes were not baked at fairly high temperatures, for a fairly long time, the water permeability was higher than was desirable.

Heat-Reactive Synthetics

The next development was the use of heat-reactive finishes. These are also completely synthetic, in that they are made from chemicals which are reacted to produce the base for them. These new finishes, of which "Duranite" is an example, may be applied by spray or dip. Their initial set-up is due to solvent evaporation, therefore there is not the difficulty with sags or runs during application. There is also far less trouble with dust or lint being trapped in the surface before the heat curing operation is completed. Pure whites are easily obtained; these whites have better resistance to exposure and corrosive influences than anything that has been developed up to this time.

These new synthetic finishes need only a short period of heat to change them to the insoluble state. Temperatures from 300°F. to 400°F. are used, with time varying from a few minutes up to as high as 15 or 20 minutes.

Washing machines, towel cabinets, refrigerators and general industrial work may be done in one coat. Various modifications of certain synthetic coatings are necessary, depending on the specific uses for which they are intended.

Philippine Mahogany Finishing

PHILIPPINE wood (often called mahogany) worked into furniture, contains many different shades of color. The only way to bring these different shades together into a harmonious ensemble is to use some type of stain on the raw wood.

I am finishing some nice suites now. I have the wood glue sized; then this surface is sanded down to make it smooth. We apply a coat of water stain and use a wash coat of lacquer sealer, and sand the sealer. Then we apply a coat of filler mixed 10-lbs. to one gallon of thinner. Our men take a felt block about 6x10-in. and pad the filler into the pores and rub it across the grain. When it has dried four hours, we refill all the tops and fronts; after the filler dries overnight we apply a coat of lacquer sealer.

When the sealer is sanded down smooth, the next operation is a coat of mahogany wiping stain. We rub this stain off and also

take a 4-in. filler brush and blend the stain to a uniform color on the wood. After the stain is dry we apply two coats of lacquer. When the lacquer is dry we rub this with pumice and oil, and use a clean-up polish to remove all the oil from the work. This leaves a nice clean finish, free from finger marks.

You can apply a coat of non-grain-raising stain to Philippine wood, and you will have a nice color to start with. Then apply the wash coat and filler, and also use the wiping stain, as you almost have to use two stains to match up the different colors of wood. Philippine mahogany, when finished right, has a mellow orange-brown color. It is beautiful when finished as outlined above.

Another good way to finish this wood is to fill the bare wood with an orange-brown filler and apply a coat of what we term a "lacquer toner." This toner is made of stain solvent and lacquer thinner, with a little sealer added to bind it; also enough mahogany dye to get the color you want. I use 8-lbs. of dye to 60 gallons of this mixture. Spray an even coat of this toner over your filler; then you are ready to put on the sealer coat. After the sealer is dry and sanded smooth, apply the wiping stain, and finish as desired.—R. E. CASEY.

Care of Brushes

IN THE first place I buy quality brushes, which helps to eliminate some of the trouble. I keep each brush hanging in a container of suitable size to easily accommodate the length and width of the brush. A hole is bored through the handle at such a point that the hanging brush will leave a clearance of 1-in. from the bottom of the can, to allow for any dirt or residue that settles on the bottom. A stiff wire is put through the handle to hang the brush, and a cover is cut to fit the handle and this wire.

I always clean a brush after I use it so that I will have a clean brush ready to use when I take it from the container. If a brush becomes dirty then I wash it thoroughly with soap and water.

Sign painting brushes, which are not used regularly, should be kept covered with vaseline worked well into the bristles. I get long life and good service by this method.—G. D. WATT.

Detroit Rex Opens New Branch Office in San Francisco

The Detroit Rex Products Co., Detroit, Mich., manufacturers of Detrex degreasers, Perm-A-Clor and Triad solvents, and Triad alkali cleaners and strippers has opened a new branch office at 111 Sutter Bldg., San Francisco, Calif., in charge of W. A. Vensel, West Coast manager. Ample warehouse stocks of solvents are carried for immediate delivery to all points in this territory.

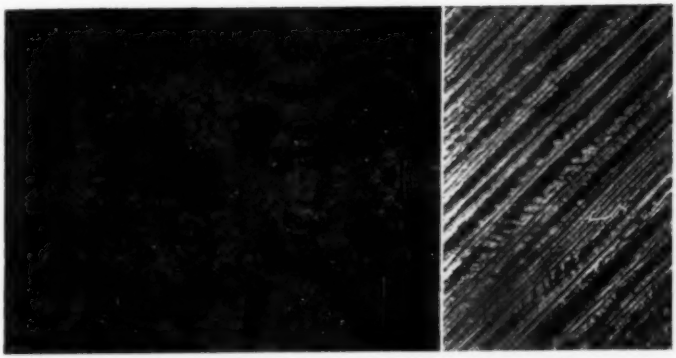
Walter K. Dow Elected V.-Pres. of The Alexander Milburn Co.

At a stockholders' meeting on May 23, 1938, Walter K. Dow was elected vice-president of The Alexander Milburn Co., Baltimore, Md.

Before becoming associated with Milburn, Mr. Dow was identified with the DeVilbiss Co., at Toledo, Ohio, for ten years in a manufacturing and supervisory capacity of paint spray equipment.

Mr. Dow has been plant superintendent of the Milburn Co. for the past year and is especially skilled in the development and production of their line of paint spray equipment.

PHOTO-STENCIL PROCESS OF *Reproducing Wood Grain*



Part of a drawer front stencil-grained to represent two different cabinet woods.

BY H. L. HIETT
General Manager of the
Prairie State Products Co.

IN A previous article published in INDUSTRIAL FINISHING, I outlined the use of the stencil screen process for decorating familiar wooden articles, such as juvenile and novelty furniture, bric-a-brac, toys and games, in one or more solid color tones.

Reproducing wood grain patterns by the stencil screen process, in the larger areas, is probably the latest contribution to the furniture industry, for it offers an inexpensive, speedy, uniform method of reproducing the grain patterns of plain and figured woods, crotches, burls, patch work and inlay, in new warm tones and in more bizarre or flashy effects.

Production and distribution are the chief problems of the furniture manufacturer. Much dependence is placed upon the equipment and methods used, plant management, designers who can lend their talents to the more modern trend of design when called upon to do so, and to the sales force.

In the mass production of furniture, the shortest and best way to lower unit costs lies not only in efficiency of the machine room but in the finishing department as well. These departments have considerable to do with profit and

loss, especially in the manufacture of low or moderately priced furniture—and a majority of furniture manufacturers are specializing in this class of merchandise, most of them finding a ready sale for their output.

Naturally, in producing this class of furniture, expensive woods are prohibitive, hence the urge to use one of the several methods for reproducing natural or synthetic grained effects upon the surfaces of cheaper solid woods. In addition to the other familiarily known methods of reproducing wood grain, there is now available the photo-stencil method for portraying all the depth, tone and beauty required at a minimum cost.

With the cooperation of the finishing department of one of the world's largest paint manufacturers, working in conjunction with a large furniture concern, I believe I have the distinction of having produced the first complete and practical set of photo-stencil plates, for the direct printing in the furniture plant, of complete bedroom and dining room suites, several of which were on display at the Chicago Furniture Mart last January.

In the past few years we have been able to produce practical photo-stencil plates for reproducing wood grain effects in coarser halftone and in a limited printing size or area; seldom was more than 330-sq.in. attempted. This was due to the fact that it was considered an impossibility for any one to prepare the proper kind of halftone photo-positive large enough for the preparation of stencil screen plates for printing, in one operation, complete bed ends, table tops and drawer fronts—sometimes in combination V-match and in some instances carrying two distinct patterns.

Selecting Natural Wood to Be Photographed

To begin with, we first select the wood desired. This is planed smooth. If the pattern is not distinctive enough for photographing, this can be treated either by bleaching or staining to bring out the grain. For example, say we are preparing a screen for a drawer front in French burl walnut, the printing area being 7½x30-in.

We first block out around the most beautiful section of the wood in a size 7½x15-in., which in length is half the size desired. A wet plate negative is made from this in 90 or 100-line halftone. From this negative

Another example of photo-stencil graining.

it is necessary to prepare a positive. Otherwise the design would print in reverse. This positive is stripped, and placed upon the left hand side of a piece of plate glass approximately 10x34-in. Now to form the other half of the design, the original negative is stripped and reversed and a second positive for the right half of the design is made. This in turn, is stripped and butted or joined to the left hand side of the design at the center, which was previously placed in position upon the plate glass support. Now this forms a single positive 7½x30-in., with both sides identically alike in grain pattern, with possibly a peculiar design at the center where the two halves are butted together.

Transfer Method of Making Photo-Stencil Plates

After we have experimented more or less with the direct, semi-direct and transfer methods of making photo-stencil plates, we find that the transfer system is the most practical. With this method we can use a 100-line halftone without any trace of moire pattern, obtaining the soft graduated tones, depth and changeability of the genuine original wood patterns.

The procedure in using the transfer method, consists of first sensitizing a gelatinized pigmented paper (the same as is used in roto and photo gravure work) in a light sensitive agent, such as potassium bichromate in 5% solution. This sensitized sheet is squeegeed while wet upon a chromium ferrotype plate and left to dry with the aid of a fan. When dry, this sheet will release itself from the ferrotype plate, after which it is placed in contact, film side against the film side of the positive, in the printing frame, locked up and exposed to a regular photo engraver's carbon lamp for from 12 to 15 minutes at a distance of approximately 40-in.

After exposure the exposed tissue is removed from the positive and printing frame and placed in a cold water bath. Within a few moments the exposed sensitized tissue is removed from the cold water bath and placed film side down against a waxed polished support, either of copper or zinc. The copper plate supporting the exposed tissue is, in turn, placed in a hot water bath, paper side up. After a few minutes the white backing paper is peeled away, leaving a gelatin deposit upon the copper plate. This plate is agitated until the image shows

up distinctly and the unexposed gelatin washes away.

The copper plate containing the washed-out design is placed in a second tank of cold water for rinsing. The plate then is placed film side up, upon a level surface and, while still wet, the blank silk screen is placed in position, face side down against the film and copper plate, and blotted from the inside. This is left to dry and when thoroughly dry the screen is lifted from the copper plate, carrying with it the gelatin etched-out design, leaving the copper plate perfectly clean.

To the layman this might sound like a long drawn out method, but it is not. After our paper is sensitized and dried and our positives are prepared, two men can produce eight to ten screen plates per day.

Silk Screen Stencil Plates and Their Operation

In making the frames and stretching the silk, we use 2x5-in. white pine for large screens, and 2x3-in. stock for the smaller ones, using No. 16 Swiss taffeta weave silk for all halftone stencil plates.

The actual printing consists of cutting and dovetailing, sanding and treating the cut pieces in the usual way and spraying the appropriate ground or undercoating with lacquer.

A work table is made available and to this is hinged the stencil screen plate. Wood guides are placed in exact relative position and the actual printing is done with either screen process lacquers or oil colors, using the rubber squeegee for making the impression.

Two men—one to rack and one to do the printing—can screen process from 200 to 250 pieces an hour. A single screen, reinforced with a 100% pure bakelite varnish, is good for at least up to 3,500 impressions—and more if it is properly taken care of and well cleaned with clean soft cloths and solvents after each day's run.

In making stencil screen plates, the initial cost is in the making of the positives. After these positives are once in hand, any number of stencil screen plates can be made. These positives generally cost from $12 to $100, according to size and number of individual stripped pieces required to make a single positive. The making of the proper kind of positive requires the skill of an expert who has made a study of this particular line of work, especially for stencil screen adaption; this also requires rather expensive equipment.

Stecil screens, not including the positives, can be made up ready to run by concerns specializing in the making of all types of screens for all purposes, at so much per square inch. Stencil screens for the furniture industry usually run from $12 to $50, according to size and grade of materials used.

Lacquer-Printed Decals Can Be Made Too

With the screens I have just outlined, a perfect lacquer-printed decalcomania can be reproduced also—with the addition of an extra screen for laying the base or ground coat. These are generally made by printing the grain pattern first upon the duplex decal. paper and laying the ground coat over this. In applying these transfers to the wood, the wood is first subjected to a thin coat of spraying lacquer and at the time of

application a thin mist of thinner is sprayed over this. While still damp, the decal. is placed, printed side against the dampened lacquer, and rolled down smooth with a heavy rubber roller under pressure. When this is thoroughly dry the heavy backing sheet of paper is peeled away, and the thin tissue is moistened with a sponge and easily removed.

The actual cost of making such decals. after the stencil screens have been prepared, is around 18c to 25c each, including application, according to size.

New Type Baking Ovens

AN OUTSTANDING development in the line of improved finishing-room equipment is the new type of drying ovens that are available today. They are electrically and thermostatically controlled and afford the finisher facilities for more accurate drying, better production through the baking and drying end of his department, and they eliminate the old time hazards of the gas going out, and of not getting the full amount of heat that the material requires for a satisfactory bake. The way the new progressive ovens and conveyors are designed reduces the loss of heat to a minimum. The designs of these ovens are made to fit any and all needs that anyone may have.

I have, at present, one of the new type progressive ovens and find it is a boon to my line of production. It has taken a worry off my mind, as it operates to my satisfaction, and I use it from 8 to 24 hours a day and find that it functions at full requirements all the time.—H. H. FORD.

Sterling Lacquer Mfg. Co. Establishes Enamel Department

The Sterling Lacquer Mfg. Co., 6417 Dale Ave., St. Louis, Mo., who formerly confined their activities to the lacquer products field, have established an enamel department. The Sterling Co. recently acquired the services of W. R. Friese, who has had many years experience in formulating all types of finishes. Mr. Friese will be charge of production.

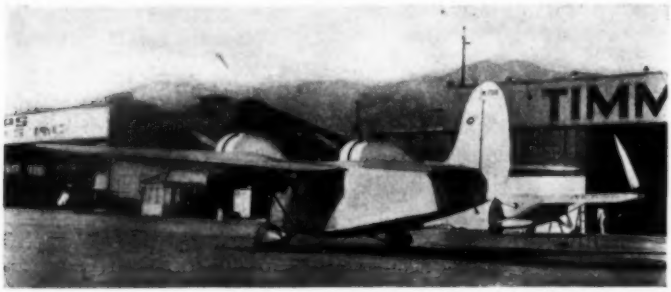
Portable Painting Instructions

Binks Mfg. Co., 3114 Carroll Ave., Chicago, Ill., announces publication of a complete set of graphic operating instructions for portable spray-painting outfits. Detailed line drawings tell the prospective spray user how to hook up his outfit, how to mix his paint, how to clean the tank and hose, how to hold the gun when spraying, and other valuable and interesting information that has been a long felt need wherever this type of equipment is used.

Copies of this valuable 6-page graphic instruction bulletin are available to those who request them.

FOR SUN ROOM OR PATIO

Maya chair and end table of rattan. Table top is highly polished narra wood. Other designs of this furniture appear at the Los Angeles Furn. Mart.



Timm Aircraft Co. . . . model No. 840; fabric covered; completed Feb. 7, 1938.

Finishing New Aircraft

BY W. R. ALLEN

Preparing and finishing fabric and metal surfaces of fabric-covered and combination fabric and metal airplanes; methods used in southern California aircraft factories.

THE YEAR 1927 inaugurated the first coast to coast passenger schedule, flown with a single-engined, fabric-covered 'plane carrying two passengers. This flight required 33 hours, 14 refueling stops, and the fare was 15c per mile. The approximate distance from New York to the Pacific Coast at that time was 2733 air miles. This route has been straightened out and shortened about 100 miles during the past ten years, through the installation of scientific air navigation instruments in present day air transport 'planes.

Thousands of fabric-covered 'planes still fly the air lanes to and from cities and towns throughout the U. S. and foreign countries; and they are necessarily finished with materials especially adaptable to their particular type of construction.

During the evolution of finishes for fabric-covered airplanes, varnishes, starch solutions, glue sizes, and other similar solutions were tried but were found to be lacking in the qualities necessary to tauten the fabric, and at the same time resist the elements and climatic changes to which airplane finishes are subjected.

Cellulose-Base "Dopes"

Eventually "dopes" (which are cellulose-base solutions for filling and finishing the fabric covering

of the wings and fuselages of this type of 'plane) were developed and are now used in large quantities for repainting, patching damaged wings and fuselage sections, and for finishing newly manufactured 'planes.

These materials have a film base compound of either cellulose acetate or cellulose nitrate. Cellulose acetate dopes are not as highly combustible, or as highly inflammable as cellulose nitrate dopes, but are more expensive due to the complicated process of manufacture and cost of the raw materials. Cellulose nitrate dopes are more commonly used, however, and give equally as good service as acetate dopes.

Rust-proof Insides of Tubular Frame-work

Let us assume that we are about to finish a newly constructed fabric-covered 'plane with the fuselage framework made of steel or aluminum alloy tubing. After welding operations are completed the first step is to coat the interior of the tubing with a material that will prevent rusting and corrosion of the metal parts. We force the rust-proofing material through the tubing with air pressure, from a pressure tank or pressure pot similar to that used in paint spraying operations.

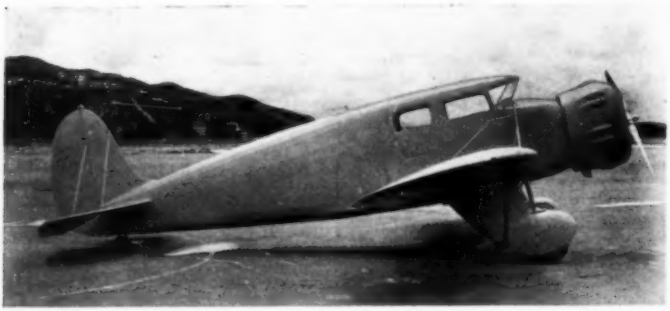
The rust-proofing material must have several specific qualities which should be considered carefully. First, it should flow freely, have good adhesion, produce a hard tough elastic film, and have the penetrating qualities usually found in a material of this nature. There are two materials* which I can recommend for this operation, as having all the qualities necessary for a thorough rust-proofing job.

The next step is to allow the tubing to drain off the surplus material, leaving the sides of the tubing, crevices, etc., thoroughly and effectively coated. This drainage of excess material is accomplished by removing small brass screws from holes in the tubing (holes drilled for this purpose before finishing operations began) but sealing the holes airtight again with brass screws when the draining operation has been completed.

Exactly the same procedure should be followed for rust-proofing all hollow parts in connection with the landing gear.

*Names given on request.

Air Transport, model T6 . . . . combination metal and fabric.



Kinner Envoy . . . . 300-hp.

Clean and Prime All Steel and Aluminum Surfaces

Metal parts of landing gear and steel tubing are then washed thoroughly with materials suitable for cleaning steel or aluminum, whichever is used, to remove all rust and scale. Then these cleaned parts are coated immediately with zinc chromate primer to avoid any possible accumulation of moisture. Care should be taken to apply a very light coat so that the metal is discernable through the film — and, if possible, allow the primer to dry for at least eight hours.

After the primer is thoroughly dry the steel or aluminum alloy tubing and landing gear parts can be coated with a synthetic aluminum, or aluminum lacquer; or, if desired in order to carry out any particular color scheme, these parts can be finished with different colored pigmented lacquers or synthetic enamels.

How Fabric Covering Is Applied

When these operations have been completed the fabric covering is applied, first making sure that all metal parts which will come in contact with the fabric, if it is to be finished with dope, are covered with masking tape. The application of tape prevents lifting of the lacquer or synthetic enamels by the dopes.

The fabric covering is then applied, as a rule, by one of two methods. The first is to lay out the fabric covering from a pattern similar to the way a dressmaker would lay out and cut the cloth for a dress. Then it is machine sewed and pulled over the wing and fuselage sections of the 'plane—just as a pillow case is pulled over a pillow. The other method is to lay out the fabric and place it over or wrap it around the parts to be covered, and hand sew the edges together.

It is important to do this work in a room that has an even temperature, if possible, because changes in the atmospheric conditions of the room have a tendency to give the fabric different degrees of tautness at different points on the wing and fuselage surfaces, when the doping or painting operation is started.

Doping or painting should be

started as soon as possible after the fabric has been applied to the surfaces of the 'plane.

Purpose of Dope Applications; To Tighten Fabric, and . . . .

The primary purpose of the first coats of airplane dope is to fill the pores of the fabric and tauten it. The first two coats of nitrate dope should be brushed, carefully working it into the fabric. When dry, these surfaces should receive a light sanding. The third coat should be sprayed on. After it is thoroughly dry, follow with three coats of semi-pigmented dope, following the manufacturer's recommendations for reducing, and allowing time for drying between coats. This is followed by either lacquer or pigmented dope to produce the desired finish in practically any color.

I would like to mention, at this point, the doping of a fabric-covered airplane which I recently witnessed. When the operation was completed, sections of the wings and fuselage were badly out of line. After carefully checking over each step, it was found that the covering had been applied too tightly before the doping was started. As a result the dope tautened the fabric to such an extent that the pull caused a disalignment of the sections referred to. The operators, at first, were inclined to blame the misfortune on the quality of the dope.

If the 'plane has a metal fuselage with fabric-covered wings or aluminum cowlings, these metal parts should be coated (after thoroughly washing and removing all rust and scale) with a light application of zinc chromate primer, followed by succeeding coats of either pigmented lacquers or synthetic enamel.

Fabric Wings More Easily Repaired in Remote Localities

Airplanes constructed with metal fuselages and fabric-covered wings are sometimes used for carrying ore in Central and South American countries; and also for the transportation of passengers. They have the added advantage of being more easily repaired, particularly where wings are damaged and require patching, because the mechanical facilities for repairing wings, which are most commonly damaged, are inadequate in isolated localities. This brings to mind an operation which is important and will perhaps help solve a painting problem where patches are being applied, to fabric-covered wings or fuselages.

After the patch has been sewed in place it is necessary to build up the fabric surface with same materials as were originally used. Unless great care is exercised in applying the base materials they will lift the top coats on either side of the patch. The best procedure is to apply a clear lacquer or dope sealer, lapping it over the color on all sides of the patch—but exercise great care to apply as light a coat as possible, almost a mist coat, and allow it to set thoroughly before proceeding with the necessary coats to finish the patch like the original, and undamaged parts of the 'plane's surfaces.

Author's Note: I am working on an article, for your approval, on finishing the interiors of metal transport 'planes, which will in-

clude seats, instrument boards, control levers, air ducts, head linings, pantrys, toilets and doors. Also an article on finishing airplane motors, both new and overhauled . . . . Pictures will also accompany these articles.

Refinishing Porcelain

SOME time ago I asked for information about a method of refinishing industrial wash-bowls, urinals, etc., from which the porcelain had been worn away after long service. Inasmuch as no satisfactory information was forthcoming, I experimented with various paints and methods. The most satisfactory and economical method follows:

Remove all foreign substances such as grease, rust, etc. Spray or brush on a thin wash-coat of synthetic metal primer; then apply one or more coats of synthetic machinery paint, which resists water as well as oil and light acids. Follow with a coat of clear synthetic—one that is resistant to water, oil and acids. Allow the finish to become thoroughly dry before allowing the painted equipment to go back into service.

In our plant we use a gray-green synthetic machinery paint that does not show dirt very much. This finish can easily be cleaned with kerosene and oil. Strong and gritty cleaning substances should be avoided. In the electrical and other departments, where a great deal of acid is used, we clean with kerosene oil and then apply a thin coat of no-rubbing floor wax. Sometimes it is necessary to use something besides kerosene as a cleaner. In this case a mild soap powder can be used after all of the kerosene has been removed with a cloth. If it is not removed first, the soap will become gummy. Our cleaning costs are lower since finishing with synthetics.—H. H. GLINKE.

THE "CORONADO" DESIGN

Round coffee table and part of davenport in the "Coronado" design now so popular on the Pacific Coast. Notice the hand painted table legs, as well as the naturally worn antiqued edges. Photograph furnished by courtesy of the Los Angeles Furniture Mart.

One-Coat White Metal Lacquer

Quoting a letter from Standard Industrial Products, Inc., Grove St. & Shanklin Ave., Evansville, Ind.: "We have developed a new one-coat white metal lacquer in which we have combined remarkable hiding power and an unusual degree of adherence to bright metal without the use of primers.

"This material is especially adapted to coating small metal parts where it is not feasible to use the new high-bake finishes.

"Samples of this new SIP finish are available on request."

How to Mix Stain Colors

TO MATCH VARIOUS WOOD FINISHES—II

Second and final installment of an article that tel's how to mix stain colors to match a sample finish on any kind of wood; how to translate small proportions of an experimental formula into large quantities to be ordered from the stain manufacturer; how to test stains for perfect color matching; and what to look for in case any variations occur in the color of the newly finished wood surfaces.

LET US ASSUME that we are confronted with the problem of finishing a piece or a carload of furniture to match a sample color panel which may be the size of a postal card or smaller. Having secured a number of convenient size panels of the exact species and type of wood to be finished, we call a conference with our wood shop foreman to clarify the following points: What grade of sandpaper will be used on the final sanding? How will the sanding be done; by hand, belt, stroker, drum, disc, or automatic sander? How many hours or days will elapse (approximately) between this final sanding and the staining? Will the wood surfaces be glue sized or sponged? Will all sanding dust be blown clear of the wood before the work reaches the finishing room? Having made these determinations, we prepare test panels accordingly.

Fill a burette with each of the primary color solutions exactly to the 0-c.c. mark. Only experience will reveal just which of these colors will be required, but for the sake of explanation let us assume that we wish to match a cool or neutral brown walnut color on plain sliced-walnut veneer with a dark pore. This color will probably be obtained with yellow, orange and black.

From the orange burette draw carefully, say 4-c.c. of stain into a small cup, glass, or graduate, watching the top of the liquid carefully and stopping exactly on the 4th graduation line. In the same manner, add 1-c.c. of black and 3-c.c. of yellow. Always keep score of these withdrawals on paper as follows:

Orange	*Black*	*Yellow*
4	*1*	*3*

Mix the three thoroughly with a glass rod or stick and you will have about 1½ teaspoonsful of a brown stain. Place a test panel at an angle of about 60° to the horizontal (it's an excellent practice to have a stand to keep this angle constant) pour the mixture on the surface and allow it to flow down. It doesn't matter much whether it flows with or across the grain, but again we say: "Be consistent." Always do it the same way.

Preparing for Color Comparisons

Naturally, the system must be complete before a color comparison can be made, so it will be necessary to dry the stain—from four hours to overnight for a water stain, and one hour for a non-grain-raising type. Apply the wash coat, if any. Fill, dry the filler, and apply a coat of the finishing material to be used. In the interest of expediting final results it is usually permissible to force dry water stain and fillers in an oven or on a steam pipe at a temperature of as much as 120° F. An hour of such force drying will be sufficient to permit following with the next operation.

Of course, the actual color will not be entirely apparent until a finish coat of shellac, lacquer or varnish is applied over it and dried until the surface is no longer actually wet.

Let us say that after making this initial attempt at brown walnut, the result is apparently too cold and yellow—perhaps a greenish yellow. Possibly the tendency in that direction is slight, so let us add orange. The original spoonful is all used in our flow down, so we start over and make a new mix, incorporating the additional orange. The score sheet will then read:

Orange	*Black*	*Yellow*
5	*1*	*3*

Repeat the flow-down and coating treatment and check against the sample. Compare colors by north or by indirect light — never in sunlight and never in artificial light if it can be avoided, and then only by the rays of a daylight lamp. For close discrimination, hold the pieces vertically or inclined toward you at arms' length. Reverse one — then the other. Inspect across and with the grain. Lay them flat on a bench or table and inspect them from all angles, reversing them in their relative position to each other.

Final Adjustment of Color Formula

Perhaps now our color is just a trifle warm or reddish and slightly on the golden or pinkish side. A third logical mixture then might be:

Orange	*Black*	*Yellow*
5	*1½*	*3*

Let us say that the above formula gives us a satisfactory match to our sample. In the literal sense, a match exists when (barring such irrelevant factors as size and physical structure of the sample panel, sheen and build of top coats, etc.) the original and our chip cannot be distinguished from each other.

A quick and fairly accurate gauge of color can be made by an experienced person over a wash coat or even over the filler, by wetting a small spot or wiping it with a drop of oil—any-

thing to give a wet refractive surface. While the spot is wet a true color will be shown.

Adapting the Formula to a Quantity Basis

In the supposition that our last attempt gives us the color we require, we then consider the calculation of formula for the stain in quantity. Let us assume that it is a water stain and that we will require a large quantity of it. Referring to the concentration of standard solutions, they may be something like this:

Orange	*(per gallon)*	*3 oz.*
Black	"	*1 oz.*
Yellow	"	*4 oz.*

Since the units used of each color were volumes of solution, let us assume for convenience that they were gallons. We use, therefore, 5x3 or 15-oz. of orange powder; 1½x1 or 1½-oz. of black powder; and 4x3 or 12-oz. of yellow powder to make 9½ gallons of stain. Assuming, for convenience, that our ounces are pounds, we can advise our dye supplier (from whom the original supplies were procured) that our requirement is for a stain powder composed of 15-lbs. (or a multiple thereof) of his Orange No. —; 1½-lbs. of Black No. —; and 12-lbs. of Yellow No. —. On receipt of a sample of the supplier's mix of the above, it may then be checked against the 5-1½-3 ratio of standard solutions.

Since we made 9½ gallons of stain (theoretically) from 28½-oz. of powder, the mixed powder as received from the supplier will be prepared at a ratio of 28½ divided by 9½, or 3-oz. per gallon.

Concentration of the mix, of course, must be adjusted in achieving the match, and it may be thus necessary to add water or reducer. Measure this as carefully as the solutions and add it to the formula sheet. For example, if we find it necessary to add 1-c.c. of water to our original blend to produce an exact match, our formula would stand:

Orange	*Black*	*Yellow*	*Water*
5	*1½*	*3*	*1*

We would then have 10½ gallons of stain for each 28½-oz. of powder, or a ratio of 2¾-oz. per gallon.

If non-grain-raising stains are being used and are going to be purchased in solution, it is only necessary to supply the stain manufacturer with this formula as our requirement, wherein his recommended reducer will appear instead of water.

Matching Wet Samples

The matching of a wet sample of stain is conducted in a similar manner, except that identical flow-downs or spot tests must be made. However, it is not only possible but advisable to make a dip into each solution of a piece of white unsized paper or veneer, or to supply a drop of each from a stick or glass rod to a neutral absorbent surface for comparison.

Routine checking of receipts of stain in solution form may be performed quite easily and accurately.

All such comparisons should be made as flow-downs, both always on the same piece and as nearly simultaneously as physically possible. Always support the test panel at the same angle and pour the same amount of each stain over approximately the same

area. Saw or knife cuts in the surface will aid in confining the flow-down to the desired area.

Checking and Comparing Results

Veneered or solid panels of selected clear white hard maple make a good medium for checking stains. Before making the flow-down, sand the panel carefully and smoothly, always with the same grade of paper, and blow away all of the dust. Allow the flow-downs to drain and dry one hour for non-grain-raising stains; and overnight or at least an hour at 120°F. for water stains. Apply a coat of shellac, lacquer or varnish, and compare results.

Allow a drop of stain solution to fall on a piece of filter paper. Observe its spread and penetration, particularly the uniformity of color spread. If it is a blended or mixed color, observe whether the colors remain blended or form concentric rings of color. Examination of the back of the paper will show penetration and whether or not any one ingredient "strikes in" or bleeds through.

In examining dry stain powders, sift a very small quantity into a paper folded once to form a trough. Dip a piece of filter paper, or other heavy unsized paper, into the indicated solvent for the powder (water, alcohol, etc.) and blow the powder onto the wet surface. The particles will dissolve immediately on striking the surface and, being widely dispersed, will show at once the tinting ingredients used, their shades, approximate solvency, and relative tonal values.

Little Things That Effect Stain Color Matches

Many small variables affect the match of a stain job to a finished chip or piece. It is well to have on hand several types and shades of filler and try them successively. In browns, for example, a quite different result may be obtained from burnt sienna-umber filler than from a straight Van Dyke brown.

In light, natural or blond finishes, beware of the color of your top coatings. Few clear furniture lacquers are really water white, and most varnishes are less so. For final color determinations therefore, on close matching, put on the complete finish before making your final decision. The addition of another coat of lacquer on a light finish will cause an almost unbelievable difference in the final color.

Since there is such a great variation in the texture, grain and absorbent qualities of different woods, and so much variation in the technique and results produced by different spray operators, a great deal depends upon the judgment of the operator on maintaining a constant color. There is a widespread tendency to "fog" on stains, which places this responsibility even more definitely on the shoulders—or rather on the trigger fingers—of the spray man.

The most consistent and satisfactory results are obtained by applying stains in such concentration that a "wet" coat—one which shows a glistening film on the surface, just short of running—will give the desired color depth in a single application.

Why Uniformity of Stain Colors Is So Difficult

Uniformity of color in successive pieces is always a problem, even when rigid controls are exercised upon the stain and upon the methods of application, due primarily to variations in the wood itself. Variations emanating from sponging, sizing and sanding are other factors subject to whatever regulation may be possible.

Treatment of end wood may be handled through the use of glue or shellac sizing, or by moistening the surfaces with water or solvent, as the case may be, just before staining.

It is not only possible but entirely practical, when finishing low-priced merchandise which is dipped in water stain, to add a sizing to the water stain. By regulating the solvency at the same time, you can produce a "stain-size" of typical water-stain color character, but coupled with a sealing action, that will be almost equal to that of a light coat of shellac or sealer — together with a drying time for recoating of less than an hour. This is an old trick, but due to some measure of instability, the material is not marketed ready for use to any extent. It is not recommended for high quality furniture, but for low-priced chairs, juvenile furniture, and many novelty pieces, its use serves to reduce finishing costs by saving a coat of material.

Consistently satisfactory staining—like all other finishing operations—has no Utopian short cut or royal road to perfection. The purchase of materials from reputable concerns, the observance of intelligent care in the use of these materials, and the constant guarding against a host of conventional variables will go a long way toward making it possible to produce satisfactory results.

Portfolio of Case Histories—Solutions of Finish Problems

The copy of 17 case histories, with a few pages of introduction, recently sent to this office by the Industrial Research Division of the Wipe-on Corp., 105 Hudson St., New York, N. Y., reveals interesting data about the solution of many finish problems. Among those discussed are finishes for shoe eyelets and magnesium alloy, a coating to resist sulphuric acid, another to withstand moisture, a burn-proof enamel, a two-tone finish for metal fixtures, aircraft finishes and a non-discoloring white for metal cabinets.

Quoting from introductory remarks appearing in the portfolio:

"These finishes represent the latest developments in the chemistry and technology of paint and varnish making. We specialize in the newer types of coatings and are well equipped to develop finishes to meet your own particular requirements or production problems."

Cleaveland Laboratories & Mfg. Co. Open New York Office

The Cleveland Laboratories & Mfg. Co. of Newark, N. J., announce the opening of their sales and executives offices in the General Motors Building, 1775 Broadway, New York, N. Y., effective April 1, 1938. Sales of "No-Tarnish," "Maskalaco," the "Alaco" line and "Clearseal" will be controlled from this New York office.

"Speedy Wax"

Pint-size cans of "Speedy Wax," a liquid preparation for cleaning and waxing an automobile finish in a single operation, are now being made available to the consumer trade. The wax, recently developed in the laboratories of the du Pont Co., has been handled up to this time in gallon containers sold only to the shop.

White Quick-Bake Enamel

A quick-baking white enamel that doesn't discolor with age, and which has a porcelain appearance and hardness, is announced by the Industrial Research Division of Wipe-on Corp., 105 Hudson St., New York, N. Y. It is called "Tuf-On 6003 White Quick-Baking Enamel"; can be sprayed or dipped; bakes 30 minutes at 350°F., one hour at 300°F., or 1½ hours at 250°F.

One coat of this material is often sufficient because of its unusual hiding power and because of its excellent adhesion. This is particularly true over solvent-cleaned steel, bonderized steel or primed steel, but over some surfaces an undercoat is recommended.

The baked coating has excellent resistance to grease, soap, alkali, acids and solvents. It is available in white, pastel tints, darker colors and clear. For thinning, the manufacturer recommends xylol or high-flash solvent naphtha.

This finish is recommended for many metal products that will not be subjected to long outdoor exposure, such as refrigerators, washing machines, manglers, kitchen and bathroom cabinets, kitchen fixtures, electrical household appliances, hospital and laboratory equipment, metal furniture, stove parts, etc.

"OM" Spray Gun

The OM spray gun, announced by The Alexander Milburn Co., 1493 W. Baltimore St., Baltimore, Md., is equipped with the revolutionary hollow-air-atomizer head, with integral locknut, which discharges air in hollow conical shape from jets in the side wings, flattening the fluid by means of large soft areas of air and atomizing to the outermost edges of the spray.

The hollow-air system is outstanding for spraying synthetic enamels, which are particularly difficult to atomize, but also sprays with excellent efficiency other fluids, such as lacquer, enamel, paint, shellac, varnish, stain and airplane dope.

New...

MATERIALS
SUPPLIES
EQUIPMENT

The nozzle is furnished in two styles—standard siphon or pressure-feed and mushroom-type pressure feed; both are made of special steel, hardened and ground to absolute concentricity. The standard siphon-feed nozzle has a smaller diameter surrounding the orifice but will operate on either siphon or pressure feed. The mushroom-type pressure feed nozzle has a larger diameter and is tapered. It is especially designed for large production work, long life and fluids difficult to spray, including ceramics.

The OM spray gun is equipped with a replaceable thread baffle ring assembly which is a revolutionary achievement, eliminating the ex-

The integral fluid nozzle cap is made of stainless steel; trigger is nickel silver.

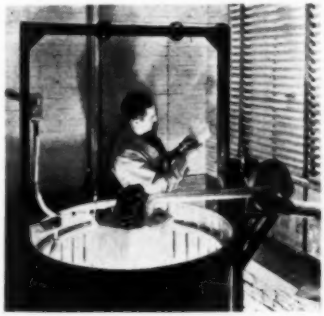
pense of separate spray heads. This assembly is held to a true concentricity on the spray gun body by a ground shoulder on the fluid nozzle, insuring positive alignment of the atomizer head-locking ring. Replacement of the entire gun body or spray head is eliminated when threads have become worn.

The fluid and air connections, with positive locknuts, are replaceable and interchangeable and do away with the use of adaptors.

Refinishing Enamels for Refrigerators

To meet the rapidly increasing demand for refrigerator refinishing enamels that are equal or superior to the original finish in appearance and resistance to typical abuses, the Sherwin-Williams Co., Cleveland, Ohio, has developed four new refrigerator refinishing enamels.

Opex (lacquer type) refrigerator enamels No. 30576 and No. 30577 are



Giving it the Weatherometer test.

identical in quality, varying only in shade. The first approximates the shade of a new refrigerator; the latter, that of an old or bleached box. By intermixing these materials, any intermediate shade can be obtained.

Two Kem (synthetic type) refrigerator enamels, which meet these specifications, are also available. The Opex refrigerator enamel takes 100% to 120% reduction with Opex thinner No. 10 for spraying. Retarder thinner No. 04861 is recommended for the final coat in order to insure maximum flow.

Approximate drying times are given as: Set-to-touch, 15 to 20 minutes; tack-free, two hours; to handle, 8 to 10 hours. Complete instructions are given on the labels.

Kem refrigerator enamels are said to provide maximum color stability, and resistance to humidity and grease. Their drying times are only slightly greater than the Opex line, but their ultimate degree of hardness and resistance is reached after about two weeks. The recommended reduction for the Kem line is 10% to 20% with Kem reducer No. 75 for spraying. Two or more coats give an exceptionally lustrous and brilliant finish.

Ground Coat Dye for Graining

"Art-Veneer," a product of the Standard Industrial Products, Inc., Grove St. & Shanklin Ave., Evansville, Ind., is a dye coating for use on plain cabinet woods that are to be grained by the etched copper plate method. This dye takes the place of the usual pigmented ground coat, the manufacturer offering it as a treatment that largely eliminates the painted appearance of the usual ground coat. Quoting from the company's letter:

"You will find, with this new transluscent Art-Veneer, that the actual grain of the wood is easily seen—a feature which many of the buyers of furniture in this bracket have been trying to find. It has the same drying time and, by correct application by spray, perfectly adapts itself to the light, medium, or dark shades which you are trying to reproduce.

"With the new improvements in

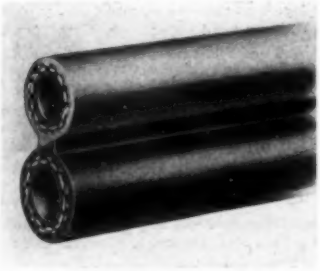
dyes, both light and dark shades of the sap parts of woods can be finished in clear lustrous tones of walnut, mahogany, satin wood, etc.

"The ink used in this type of grain printing is of prime importance in obtaining exact shades of color. Here, too, manufacturers will find it to their advantage to turn over their problems to a finishing house fully experienced in graining dyes and coatings, for it is most completely equipped to furnish correct shades upon short notice."

Twin Paint and Air Hose

A development for long service in spray painting is a special twin air and material hose, joined by the famous "Siameez Web," that assures a safe lasting joint, according to Binks Mfg. Co., 3132 Carroll Ave., Chicago, Ill.

The sturdy tube of the black paint hose is made of a special composition (not rubber), which is unharmed by turpentine, naphtha, benzine and other solvents used in paints and lacquers. The rubber composition tube of the red-air hose is dense and thick for air service. Each hose is reinforced by braids of strong cords. The tough covers are made of paint-resisting rubber compound. This paint and air hose is made in continuous lengths to 50-ft. Exceptionally smooth finish inside and out.



One is black; one is red.

Airconditioning Unit

The Paasche Airbrush Co., 1917 Diversey Parkway, Chicago, Ill., calls attention to its new airconditioning unit in a letter from which we quote:

"The separator supplied in connection with this airconditioning unit has proved 70% more efficient than

Cleans compressed air at booth.

any previous separator and positively removes all water, oil, dirt and foreign matter from the airline.

"This new type separator has no packings or parts ever needing replacement, but keeps clean automatically as the airvalve is opened. There is nothing to wear out, replace, or adjust. There are no filters to insert.

"In eliminating all water, oil, rust, carbon and scales collecting in the airline, we use a new type mesh wire arrangement instead of brass coils, and no dirt, oil or foreign matter may pass through this unit and again enter the airline. Double protection is provided by special air-inlet slots in the outlet tube."

Duart Wrinkle Enamels

A new line of wrinkle enamels, which greatly extends the usefulness of this popular type of finish, has been developed by Maas and Waldstein Co., makers of industrial finishes, Newark, N. J.

Heretofore, wrinkle finishes have

OXFORD
VARNISH CORPORATION

directs attention to its line of . .

INDUSTRIAL and
TECHNICAL . .

PAINTS
VARNISHES
LACQUERS
ENAMELS
PRIMERS

Color and design engineering of individual and distinctive finishes

DETROIT, MICHIGAN

been available only in the darker colors, but Duart Wrinkle Enamels, as the new M & W line is called, can be supplied in every color, including white and light pastel tints. Practically no discoloration occurs during the baking process.

Another improvement claimed by the manufacturer is that Duart Wrinkle Enamel bakes hard and wear-resistant with a short baking schedule, whereas the older enamels remained rather soft unless baked at high temperatures for a long time. Uniform wrinkling, without glossy spots, "shiners," or "fish eyes," is also claimed for the new product.

The product is light in body and can be sprayed like synthetic enamel, giving a high coverage per gallon. The patterns can be varied from a very fine and uniform to a very coarse and heavy structure. One coat is all that is needed. Duart Wrinkle Enamels are manufactured under license of New Wrinkle, Inc.

Protects Hands

A protective hand cream for use by finishers, polishers and cleaners is announced by V. E. P. Co., 444 E. Lafayette Ave., Detroit, Mich. The trade name is "Sealerine."

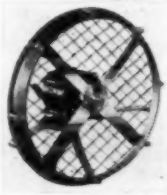
Before a man starts to work, he rubs a coat of Sealerine hand cream on his hands and under his finger nails, rubbing it until it disappears. One application will last three or four hours. When he is through work he simply washes his hands in running water. To his surprise, he can readily wash off all paint, dirt, grease and soiled thinner, leaving his hands clean and healthy.

Exhaust Fans

A new exhaust fan, designed to effect rapid movement of a large volume of free air, has been added to the standard line of The DeVilbiss Co., Toledo, Ohio.

These fans, available with ¼-hp. or ½-hp. direct-connected electric motors, provide an effective and economical means of exhaust wherever a general vapor, fume or dust condition prevails. They are built for use with spray-finishing equipment as well as for other exhaust purposes.

Ball-bearing, explosion-proof electric motors with which the fans are equipped meet the requirements of



The ¼-hp. 4-blade fan.

the Fire Insurance Underwriters for handling hazardous as well as ordinary vapors, fumes and dust. They operate smoothly with a minimum of power consumption, and can be installed in window, wall or ceiling openings provided for this purpose.

The ½-hp. motor turns a four-bladed fan 1725-r.p.m. to move 6350-cu.ft. per minute. Where exhaust volume requirements are somewhat less, the two-bladed fan on the ¼-hp. motor removes 5250-cu.ft. per minute at the same r.p.m.

Fan construction is strong and durable. The ring is grey painted cast iron, and blades are air foil type, made of highly polished aluminum to provide maximum draft with minimum size and weight. The one-piece galvanized wire screen safety guard bolted on motor side of the fan gives necessary protection when installation is within reach of persons in the room.

O. Hommel Co. Changes New York Address

The O. Hommel Co. (bronze powders, chemicals) recently moved their New York office from 421 7th Ave., to 200 W. 34th St.

WOOD LACQUERS

The Egyptian Wood Lacquer Line contains all the necessary items for a complete finishing job. Stains, fillers and top coats for all types of woods. There are numerous materials, each formulated to meet the standard needs of the average wood working plant.

In addition to clear lacquers of all degrees of luster, there are colored enamels for a diversity of wood finishing requirements. These too, are furnished in satin or glossy finish . . . There are thirty-two shades and black and white.

Booklets describing both the clear lacquers and the pigmented lacquers and their application will be sent to interested manufacturers upon receipt of request.

The Egyptian Lacquer Mfg. Co.

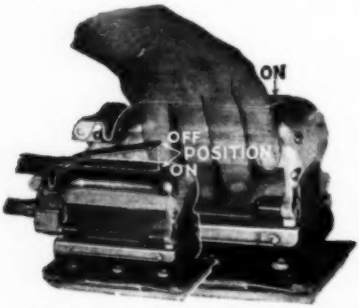
Rockefeller Center

New York, N. Y.

EGYPTIAN FINISHES

Automatic Valve Control on Air Sander

The Sterling Products Co., manufacturers of the Sterling Speed-Bloc Sander, have developed a new and unique automatic valve control to prevent wastage of compressed air.



Showing the "on" and "off" positions.

Without thought or effort on the part of the operator, this device automatically starts and stops the sander and controls the flow of water when hose is attached for wet sanding.

Low air consumption is one of the outstanding features claimed for the Sterling Sander. The use of aluminum pistons and expander rings mounted behind piston cups reduces air consumption to approximately 5½-cu.ft. per minute under full load at speeds of 3000 oscillations per minute. Tests indicate that the air wasted will approximate 15% to 35% of air consumed in the operation of the machine. This waste is eliminated through the use of automatic valve control. In addition, operating efficiency is materially increased by providing freedom of both hands to operate the machine and manipulate the product being sanded or rubbed. This is particularly desirable on gas sanding and rubbing applications.

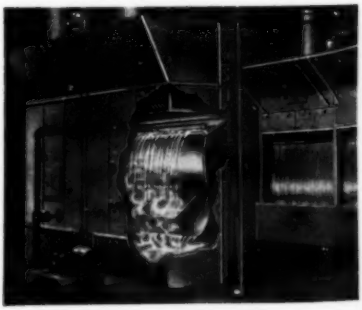
The control is designed to fit all model Sterling Sanders and is quickly installed by simply removing the hand-operated air and water cams, using same holes that held the cams to install the automatic control.

Descriptive literature will be forwarded upon receipt of your request for circular No. 1045 addressed to the Sterling Products Co., 2457 Woodward Ave., Detroit, Mich.

Water Spray Booth

The Newcomb-David Co., Detroit, Mich., recently introduced a new water-type spray booth known as the Newcomb-David Torrent-Type Spray Booth. Because of its special construction, and by incorporating a new principle of operation, this booth is offered at a considerably lower price than the Newcomb-David booths which include water-spray cleaning tubes. It is also more economical in average production use, requiring slightly less horsepower for operation.

In the Torrent-Type Spray Booth, water is drawn from the sludge tank and pumped to a horizontal pipe located near the top of the booth. The water pours in a steady volume from this pipe into a trough which deflects half of the water into the cleansing chamber at the back of the booth, and the other half over



Showing how curtain of water flows.

STANLEY

An Old Story, but —

one which bears repeating:

During the hot humid days of summer when Spotting Out again becomes a problem

1617

Reg. U. S. Pat. Off.

CLEAR METAL LACQUER

proves its superior value. It is the Original Non-Spotting Lacquer—formulated in 1927.

TRY 1617 THIS SUMMER

It is crystal clear.
Hard and durable.
Has excellent adhesion.
Does not turn green upon exposure.

THE STANLEY CHEMICAL CO.

EAST BERLIN, CONN.

LACQUERS - SYNTHETICS - ENAMELS - JAPANS

A Subsidiary of THE STANLEY WORKS, NEW BRITAIN, CONN.

the water curtain which flows behind the object being sprayed.

A positive suction fan above the booth carries the paint-and-fume-laden air, and a large volume of the water which is entering the sludge tank from the water curtain, into the cleansing chamber. As the air and water are drawn up, they meet the cascade of water pouring from the pipe and trough at the top, with the result that a violent churning of air and water is developed in the chamber. Because of this churning action, the air is thoroughly cleansed before it reaches the eliminating plates in the top of the booth and the fan in the exhaust stack.

The water curtain is essentially the same as that of the Newcomb-David Tube Type Booth. As paint is sprayed against this curtain, it is immediately carried downward to the sludge tank at the base of the spray booth. No paint accumulates on the walls or back of the booth, and that which is deposited and preserved in the sludge tank can easily be removed for reclaiming.

The principal feature of this booth is that, with the elimination of nozzle resistance, a much greater volume of water is pumped with less horsepower. It is sturdy in construction and offers no possibility of paint clogging in any place where operation might be impaired.

Sparkle Rip-pls

Fine Gloss with Gold

Hilo Varnish Corp., 42-60 Stewart Ave., Brooklyn, N. Y., has sent us a new bulletin (15-S) with eight beautiful color samples showing a metallic sparkle added to the attractive wave line effect of the fine gloss ripple finish—a baked finish.

According to the bulletin, this sparkle ripple finish may be used on any non-porous surface. It is well suited for air-conditioning units, automobile heaters, typewriters, adding machines, toys, etc. The coating is proof against alcohol, grease, moisture and oil.

The sparkle ripple effects are obtained by adding gold bronze powder to fine gloss ripple of the sample colors shown, in the proportion of 4-oz. of gold bronze powder to one gallon of ripple. Best results are obtained when the bronze powder is added at the time the material is used. Only enough material for one day's work should be mixed.

After the bronze powder has been stirred in thoroughly, the sparkle ripple is reduced 7/1 with reducer for spraying. A full coat is sprayed, as thin coats may give gloss spots and poor rippling. The finish is baked 1½ hours at 200°F.

Striping Tools Improved

A bulletin from Wendell Mfg. Co., 2535 N. Ashland Ave., Chicago, Ill., gives information about the following new and improved products added to the company's line of striping equipment:

1) Type "A" striping tool is supplied with finger grips to control the tool with more accuracy while striping. It has a stronger guide mount.

2) Type "V" striping tool is supplied with an improved guide mount. It is lighter in weight and easier to control.

3) Both tools have improved wheel-holder assemblies and are now available in eleven stripe width capacities.

4) The material travel between the supply bottle or force-feed tube and the wheel has been shortened.

5) Type "E" striping tool is entirely new. This type of tool is for use with striping materials put up for mechanical striping tools in collapsible tubes.

No-Finger-Print Taupe

The name "Taupe" signifies a special color of the Blue Knight flexible enamel groups of materials offered by the Roxalin Flexible Lac-

All of the lustrous finishes for COUNSELOR Bath Scales were created in our Studio!

Whenever you have a finishing problem . . . a new product that requires an appropriate dress . . . or an old product that is not keeping pace in sales . . . get in touch with us and let us tell you how our Creative Studio can serve you without cost or obligation.

ROCKFORD VARNISH COMPANY

Manufacturers of Finishing Materials

ROCKFORD, ILLINOIS

quer Co., Inc., Elizabeth, N. J. This particular tone is neutral. It has the happy quality of being a masculine shade that is equally appealing to feminine tastes. As a color, decorative authority assures us that it is a harmonic for any other color or successful combination of colors. Taupe corresponds (in fair approximation) to oxidized electro-plated finishes.

The ability of a Taupe finish to render apparently undetectable such phenomena as dust, finger marks, and such metal imperfections as scratches, file marks, etc., is due not to a wrinkled or "trick" surfacing (Taupe is smooth) but to the peculiar nature of the pigment-vehicle combination.

The pigment includes light-refractive particles which add to the handsome color effectiveness and create the optical effect which causes dust and finger marks to be invisible. For this reason slight defects in metal surfaces, which would be unsightly in other finishes, do not show in a Taupe finish.

The material reduces 2/1 with thinner; can be applied directly on clean bare metal; requires no primer; is available in air-drying and bake finishes; air-dries in 15 minutes; the finish is not harmed by gasoline or oil; has remarkable flexibility, toughness and hardness; doesn't chip, flake or peel.

The finish is sufficiently flexible to withstand heavy stamping pressure, which is assurance against costly refinishing that results from rejects caused by rough handling on the assembly line.

Pressure-Feed Spray Unit

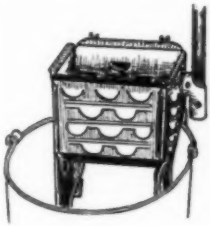
The Eclipse Air Brush Co., Inc., Newark, N. J., announces a small pressure-feed spray unit known as the B+, available in 1-qt. and 2-qt. sizes, for use with any Eclipse gun. This unit fills the gap between the cup gun and the full-size spray unit.

The B+ unit has all the refinements of control and adjustment found in larger Eclipse units: pressure regulator, air gauge, shut-off valve on air supply, Eclipse 3-way release valve and safety valve, mounted on a durable, lightweight control head. The container screws directly into the control head. Air and fluid hose, each 4-ft. in length, connect the container and gun. A T-shaped handle for easy carrying provides a means of hanging the container from belt, ladder or any convenient projection near the work.

Can be attached to or separated from gun.

With the B+ unit, the gun will spray with full efficiency in any position, including the vertical pointing directly up or down; which is not possible with the cup-attached type of equipment. By separating the gun from the container, it is possible to reach surfaces not accessible to a cup gun. The elimination of the weight of the container and material from the work-hand speeds up the operation and lessens fatigue.

The low pressure principle, a feature of all Eclipse equipment, has been maintained in the B+ unit.



DEFIES Water Dirt Alkalis

For seventeen years the makers of a mop wringer with a reputation for high quality have chosen No. 928 Hilo Rubber Black Baking Japan.

Mop wringers are exposed to extremely harsh conditions—contact with gritty dirt, constant wetness, exposure to strong cleaning solutions—but No. 928 stands up, protecting the metal beneath it for years of strenuous service.

Hilo No. 928 Rubber Black Baking Japan gives a tough, durable, elastic finish in one coat. It is just one of 30 Hilo Black Baking Japans made to fit a wide variety of finishing requirements for wood and metal.

Send for a free sample of the Hilo Black Baking Japan suited to your needs. Mail coupon today.

HILO VARNISH CORP.

42-60 STEWART AVE., BROOKLYN, N. Y.

Boston Chicago

HILO

HILO VARNISH CORPORATION
42-60 Stewart Ave., Brooklyn, New York

GENTLEMEN: We'd like to try a free sample of Hilo Black Baking Japan.

Company.....

By.....

Address.....

City and State.....

IF—JULY

CHECK TYPE WANTED

gloss	air dry
eggshell	baking
dull	250° F.
Rip-pl	350° F.
Crystal	

FOR USE ON:

Wood....., Steel....., Cast Iron....., Brass....., Aluminum.....

To Remove Spattered Paint from Brick

In spraying white paint on a pergola, a red brick terrace has become badly smeared and spotted. Can you give us a quick and easy method to remove white paint from red brick without discoloring?—S. G. Co.

We know of nothing suitable for this other than to sponge or spray the surface generously with the solvent or thinner for the paint — for example turpentine, cleaners' naphtha, paint remover, or whatever will take it off readily. This should really have been done while the paint was still fresh and wet. After it has become dry, it may need two treatments; 1) an application of thinner to soften it, and 2) a further application of thinner to wash it off.

Of course it probably could be removed by careful and skillful sandblasting or possibly wire brushing — either hand wire-brushing or portable rotary wire brushing.—Ed.

Finish for Skis

We are interested in receiving any information you may have to offer regarding the staining and finishing of hickory skis for sporting purposes. We are now using a regular spar varnish finish, but find this type of surface does not give satisfactory protection under hard service conditions.—A. I. Co.

This question has been put to us before. About 18 months back we answered a similar question by suggesting one or two thin coats of clear outside varnish for the top surfaces and one or two or more applications of hot linseed oil for the under sides and edges of skis, following with an application of wax suitable for outside service. We invited additional recommendations from readers and received the following from Mr. J. C. Hart, a devotee of the sport of skiing:

The process you outlined is considered good practice: A spar varnish for the top of the skis and an application of warm or hot raw linseed oil for the bottom.

The application of oil, however, has nothing to do with the gliding qualities of the ski. It is merely to seal the wood against moisture and at the same time it is said to toughen the hickory. After oiling, the skis must be set aside for at least two weeks to allow the oil to impregnate the wood thoroughly. After this period, the skis should be rubbed down with fine sandpaper, since the running wax will never adhere to oil.

As a matter of fact, this oiling is generally left to the user, and the best skis are generally sold with a perfectly clear surface—not stained to cover any imperfection in the wood.

A very light coating of varnish should be applied to the bottom by the manufacturer to seal the wood while in the dealer's store, but this is always scraped off by the purchaser preparatory to base-waxing, since the wax must be applied to the bare wood.

I believe that some of the better manufacturers . . . have special processes for impregnating their skis with oil under pressure so that the entire ski is sealed.

We will welcome other sugestions and recommendations about finishing skis.—EDITOR.

Questions Answers

Why Finishes Turn Milky White

What causes finishes to turn a milky white? At first we thought improper materials that were used caused it, but now we are beginning to form the opinion that there must be something in the weather, for we are having this happen to lacquer, varnish and all types of materials, and we have had it happen where the finish has stayed perfect for at least a year in the home, and then started turning white. We have one case where the article was bought in 1927; the finish stayed perfect until this year; then it started turning a cloudy, milky white. This is what caused me to form the opinion that there is something in the weather causing this trouble.—J. J. Co. (Furniture Dealer, Monroe, Mich.).

This trouble may be traceable to any one or a combination of several causes—all of them at the factory where the furniture was made.

Perhaps the wood was not thoroughly dry when it was finished.

The lacquer may not have been properly formulated to be suitable for use on the wood or with the other finishing materials (stain, filler and sealer) with which it was used.

The varnish may have contained too much cobalt or lead drier.

The filler may not have been allowed sufficient time to dry thoroughly before the application of succeeding finishing coats. This would cause the finish to become cloudy although probably not milky white.

In the rush to get out the work quickly, the freshly filled surfaces may not have been given enough time to dry thoroughly before the application of following finishing coats.

If the furniture had been properly finished at the factory there should be no reason for it to turn white in your store—unless possibly it might have been stored in a damp basement for a long time.

Furniture manufacturers must realize that time is not the only requirement for drying filler. Under certain conditions, overnight drying may not be enough; 24 hours may not be enough. The manufacturer of furniture must give more attention to the fact

PILGRIM BEDROOM SUITE

Corner of attractive bedroom furnished with Early American Colonial in glazed honey maple finish. This suite is called the "Pilgrim." Photograph, courtesy of the Los Angeles Furniture Mart.

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that the temperature, humidity and movement of air are the factors that really influence the thorough drying of freshly filled surfaces—even though he is using quick-drying fillers.

Many concerns make a practice of force-drying their freshly filled goods in a drykiln or room where air temperature, humidity and circulation are definitely controlled within close limits. When this is done, the element of time for d r y i n g means something. After a certain number of hours of this controlled drying (determined by tests) it is safe to assume that the filled surfaces are really dry clear to the bottom of the areas affected. Then, after a little more time to allow the wood to adjust itself to ordinary room temperature (after it has been removed from the kiln) the subsequent finishing operations can proceed. This furniture will not turn gray or white in some furniture dealer's store at a later date—not because the filler wasn't allowed sufficient time to dry.—EDITOR.

Clean and Sand Tables Before Painting

In reference to an inquiry by the Q. M. Co., on pages 50 and 51 of June issue, regarding a method of cleaning steel tables to afford better adhesion of the finish, I use a wet solvent having a phosphoric-acid base. I mix my solution with hot water and scrub the steel surface briskly, especially the rust spots, welds, etc. Then, before wiping the surface with a clean cloth, I first rinse it thoroughly, using an ordinary garden hose—or else fill a spray gun cup

with hot water. By concentrating the fan of the spray gun I am able to rinse all of the cleanings off thoroughly. It is necessary to work from the top of the object downward. This rinse method not only saves wiping rags, but also cleans the welds and crevices better.

I also sand the top of the table (or other surfaces that are to receive considerable wear) cross-patch, using a power sander. The way to sand cross-patch is to sand quickly one way, then turn the sanding machine at a right angle so the abrasive scratches will cross each other. Thus the scratches will not be noticeable when the finish coat is applied. Cross-patch sanding should be done with new sandpaper so that the surface will be scored instead of polished. Side panels should be first sanded vertical and then horizontal to afford the best finish coverage.—H. H. GLINKE.

Use Crude Oil on Stored Furniture?

What effect, if any, will crude oil have on lacquered wood surfaces, such as furniture? We are members of a department store group of warehousemen and we discuss ways and means of protecting lacquered surfaces while in storage and shipment. We are interested in any information you may have in regard to other materials that can be used in place of crude oil. We feel that wax takes too much time to apply and to remove.—O. B. Co.

We do not recommend the use of crude oil on the surfaces of lacquered furniture while in stor-

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age. This oil is very likely to penetrate the minute pores of a lacquer finish and, in time, damage the finish. Also, the oil will penetrate in greater volume any cracks, slightly open joints, dirt-filled inside corners, routings, carved surfaces, etc., or improperly sealed places in the furniture and it cannot be readily removed from these areas. As a result the objectionable odor of crude oil will cling to the furniture long after it has been taken out of storage and delivered to the owner.

The suggestion of several experienced furniture finishers is: Put nothing on these surfaces until just before you deliver the goods to the owner. Then apply furniture polish and wipe off all that will come off.—Editor.

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Fine Patching

RECENTLY there appeared in this magazine an article entitled "Burn-In Patching" (Dec. 1937 issue, pages 19 and 20) which dealt with methods of rough patching on the seal coat before the piece of furniture was finished.

I will now give you some of the points on fine patching . . . . a modern patch and repair method as used on finished furniture that has been damaged in shipment or in the factory before packing.

Let us assume that we remove the crate from a radio cabinet and find a spot rubbed through on the side; also a nail scratch, a large hole and a dent on the top.

Naturally, the necessary tools and materials must be available and used for a successful and neat repair job. The patcher should have the following items: Burn-in knives, heater, shaver, sticks of lacquer in various colors, shading gun, six or eight glass cups (material containers) for the gun, several different shades of shading lacquer (or suitable materials for making shading lacquer), clear and flat lacquer, clear and flat varnish, ether varnish (which dries very rapidly), rubbing felt, burlap and abrasive; also steel-

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wool and No. 6/0 sandpaper, shellac and lacquer sealer.

First we will give attention to the rubbed-through spot on the side of the cabinet. The finish and part of the stain have been rubbed off. The damaged spot should first be sanded very carefully with No. 6/0 sandpaper. It should be feathered out perfectly all around so that no sharp edges remain. If the cabinet has a lacquer finish, it should be s e a l e d with lacquer sealer. If it has been finished in varnish, a sealer coat of shellac should be sprayed on. After sufficient d r y i n g time the surface should be sanded with No. 6/0 sandpaper.

The finisher should have different colored panels of shading stain so he can accurately match the color of stain on the cabinet.

When shading the spot, be very careful to avoid over-shading it. Shade lightly and then observe the result. The shading stain may need a little more black, a little more red, or more yellow added, or perhaps the color is okay and only needs a slightly heavier application to match the adjoining finish. If too much shading is applied it can be lightly blended out with steelwool.

Following this operation you spray the spot with lacquer or varnish. This spraying should be done at as low air pressure as possible to avoid excess fumes and unnecessary roughness. I suggest spraying different mixtures of the clear and flat varnish and lacquer on test panels to match the sheen of finish on the cabinet that is to be spot sprayed. Ether varnish can very seldom be sprayed on spot patches unless the finish is glossy or rubbed to a gloss . . . . although ether varnish should be

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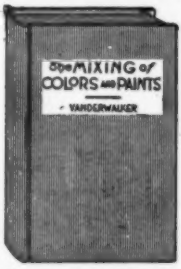

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used wherever it is to be rubbed out because of its speed of drying. If the side of the cabinet has been rubbed, a patch can be rubbed down and blended in. If not, the patch should be rubbed very lightly.

Now we are ready for the dent and scratches on the top of the radio cabinet.

If the dent is a small one it should be burned in with the right color cement (lacquer stick) and the excess cement shaved off and rubbed down.

The next hole is a large one—the size of a penny, and ⅛-in. or more deep. Part of the hole has a dark grain running through it. The lightest color to be used should be first burned into the hole, using the tip of your finger or thumb (which has been moistened) to press the cement firmly into the hole. This will prevent the cement from bubbling. Also it prevents the patch from shrinking or expanding. After this is accomplished, draw the edge of a hot knife across the strip of patch where the dark grain should be, making a very shallow depression. Then drop a darker cement into this depression and draw it out with the knife. This gives a grain effect and it looks better than a solid color patch. The patch should then be shaved and rubbed.

To repair the scratch, if it runs with grain, burn-in with either pigment or transparent cement—whichever will look the best. If the scratch runs across the grain, burn the scratch with both pigment and transparent cement in order to match the different colors. This usually looks better than a solid patch of one color. Shave and rub with either pumice and water or compound. Then polish the top with rottenstone.

I have used these methods and found them very successful, although great care must be taken in each operation to make the final job match in color so it will show no flaws.—H. F. DEAN.

S-Y Branch Sold

The Stille-Young Corporation of Chicago announces the sale of its branch at High Point, N. C., to the Marietta Paint and Color Company. The sale involves the High Point plant only, as well as good will, merchandise and accounts for the Southeastern area.

The Stille-Young Corporation will enlarge its Chicago factory and expand its sales effort in all sections of the country served regularly by the Chicago factory, but in line with its agreement with the Marietta Company will not manufacture in the Southeast.

E. T. Stille, president of The Stille-Young Corporation, is also president of the Chicago Paint, Varnish & Lacquer Association. The company's lacquers, sealers, stains, fillers and paint products are well known in the industrial and trade fields.

Air-Conditioning Manual

A book that runs over $40,000 in research and writing costs—"Trane Air-Conditioning Manual"—has been published by The Trane Co., La Crosse, Wis., on the subject of modern air-conditioning. For the student it is the simplest, most comprehensive, most practical approach to a sound knowledge of air-conditioning. For the seasoned engineer it is an invaluable handbook encompassing the problems of applied air-conditioning. Copies are available at $5.00 each.

Tumbling Barrel Bulletin

An illustrated 4-page bulletin from Lupomatic Tumbling Machine Co., Inc., 4510 Bullard Ave., New York, N. Y., gives specifications and information about the company's line of tumbling equipment and tumbling compounds for metal finishing in mass production. The company maintains an engineering and designing department for developing and building equipment for special jobs.

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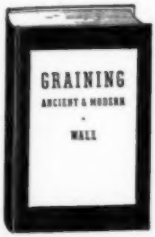

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EDITORIAL

Is Your Foreman Wasting Company Money?

The speaker at a recent simplification conference declared that 2½ hours of each employe's day in American industry are wasted, the daily loss in money running into several million dollars. Perhaps this statement is exaggerated, but even if we discount it 50% and grant that 1¼ hours of every workmen's time are wasted every day uselessly, we have something for management to think about.

Where, why and how does this wastage of valuable time occur? You can hire an expert to make an investigation and submit his reports, or you can find out for yourself. Your foreman may be so accustomed to it or so busy working himself that he doesn't recognize the wastage of time that is going on in his department; or he may know it, but for some one or more reasons he may be unable or disinclined to do anything about it.

Can it be possible that the managing executive responsible for production spends too much time away from the plant? Or is he in the office so much of the time that he is out of touch with what is going on in the finishing department?

Some wastage of labor and time occur through no fault of the foreman or workmen in the department. Equipment and tools that are badly worn or of makeshift character — these are accountable for some wastage of time, and they often cause a wastage in materials and supplies too. A poor arrangement of equipment and work stations, inadequate factory lighting and ventilation, uncleanliness, floors in bad condition, excessive vibration and noise, inconvenience in facilities for obtaining supplies and materials to work with — these are more items to check. Others should be looked for also.

In a number of establishments, management, spending less and less time in the plant, becomes so accustomed to conditions which gradually produce more and more wastefulness that some sources of wastage are not recognized. It is almost necessary to bring in an outsider to find the leaks and point out effective remedies. A competent man for this job costs money, but he may be well worth

it to the establishment. If the company can't afford the extra cost perhaps that is all the more reason something should be done immediately. In the face of such conditions, one suggestion is: Hire the expert and permit the executive, who allowed this condition to come about, to take a vacation without pay for six months or a year. At the end of that time results will reveal what course to follow.

Omit Mica From Aluminum Paints

An authority on aluminum paints, after reading a Question and Answer about the use of "Mica Powder in Paints," published in May 1938 issue of INDUSTRIAL FINISHING, page 48, advises us "that practically every state and government specification specifically requires that no mica be present in the aluminum pigment, and that the Federal Trade Commission has issued orders against the branding of aluminum powder containing mica as CP (commercially pure) aluminum bronze powder. When mica is present, the supplier must call it an aluminum compound."

Following up this point we have been fortunate in securing an authoritative article on this subject, and it will be published in a future issue of INDUSTRIAL FINISHING.

Bake Finishes on Wood

Where you least expect it you are liable to find someone contemplating the use of, or already using, high temperatures up to baking heat to dry and harden the finish on certain wood products. The baking of finishes on wood has been done and is being done—using temperatures up to and above 250°F.

Recently the question was put to us: How high can we safely go with heat to bake a finish on wood? Much depends upon the kind of wood, the condition it is in, whether or not it consists of a glued-up assembly, and other factors. To actually find out, the best plan is probably to make several tests.

For soft woods and glued-up assemblies, we believe the maximum safe temperature would range around 160° to 170°F. In some cases higher temperatures might be used safely.

However, when it comes to finishing birch and maple turnings —especially those having a hole lengthwise through the center, as in bobbins, reel spools, spindles, etc. — temperatures up to and above 200°F. have been used without harm to the wood or finish. But these turnings are carefully and thoroughly dried before finish coats and baking heat are applied. One man experienced in this class of work says:

"The unfinished wood bobbins should be treated with a low heat for at least 24 hours before enameling. The slow passing off of the moisture will gradually permit the wood to contract to its regular shape and dimensions, and not be warped or twisted when forced by a high heat while wet with enamel."

An important point to keep in mind in connection with the success of the baked finish on those wood turnings is the fact that they were completely covered with

baked enamel, even inside the holes, therefore they were practically sealed all around against the possible entrance of moisture. There could be practically no swelling or shrinkage of the wood encased within that hard, tough, protective coating of baked finish. What a difference if only part of the surface were protected; there would probably be plenty of trouble with the finish.

Another finisher of bobbins has baked the finish on his products for four hours at a temperature of 200°F. He declares that: "The pine wood racks with wire pins and the wire baskets with pine wood frames were used for months, day after day, without any charing or harmful effects."

It is possible and practicable to bake finishes on certain species of wood, under certain conditions, but before embarking upon such a venture it is recommended that a considerable amount of test work be performed to determine the exact details of the procedure and find out what heats can be safely used.

Conveyors Maintain a Steady Pace

What good is a conveyor in a finishing room? It solves a handling and transferring problem, taking the burden of this work upon itself and thereby removing much of the danger of accidents to one or more workmen. It often saves floor space and removes the element of distance between work stations. It supports parts in position for dipping, spraying or flow coating; holds them up for drainage of excess material; supports them during air-drying and oven baking; and, last but not least, it sets and maintains a steady continuous pace for the movement of products through the cleaning and finishing departments.

Every point mentioned is essential and worthwhile in any factory where a reasonable volume of output is expected. The maintenance of a steady progressive movement of products to and from operators, and through operations where possible, keeps workmen alert and gives a compelling incentive for them to develop and use the quickest ways to do quality work.

As a typical instance, we have in mind the overhead conveyor that carries automotive engines through a set of spray booths in a new factory. Completed engines come along hanging from evenly spaced hooks, with only the blocks prime-coated in dull red. As engines approach the spray booths one workman quickly hand paints around the distributor and then covers this with an easy press-fit mask. This is on one side of the engine. On the side, another part is similarly treated. A tied-together set of masks (like socket wrenches) is placed over the spark plugs.

Now the engine is ready for spraying. One man in the left hand booth sprays one-half of the engine. As the engine leaves the left hand booth it enters the right hand booth where another workman sprays the other side. The finish is a quick-drying black which becomes dry enough for handling by the time the conveyor carries the painted engine to the shipping platform or storage room. Here the masks are removed and returned to the man

who uses them. During slow production this conveyor is slowed down enough to allow one man to attend to all of the hand painting, masking and spraying at both booths.

The whole procedure is smooth but steady and continuous, and it affords safety and convenience to the workman. There is such a variety of mechanical conveyors now available for so many different kinds of work that something of this kind could be profitably used in more industrial finishing departments. It is something for production executives to consider at this time.

Using Wood Filler

FILLERS are needed and used for filling the open pores and tiny crevices of open-grain woods such as mahogany, walnut and oak. In close-grained woods like maple, cherry and redwood, the pores are very small, the wood fibers being closely woven.

Fillers are of two kinds, paste and liquid. Paste fillers are generally used on open-grain woods, while the liquid fillers are used on close-grained woods.

We mix our fillers to a creamy consistency for mahogany. It seems to fill the pores better than the heavy paste; also, it saves time.

The purpose served by filler is to "level" the surface cells of the wood and prevent the varnish or lacquer from sinking in and from giving a pitted or rippled effect. These effects are apt to remain, even though several coats of varnish or lacquer are put on, unless the undercoats are rubbed down very close. It is cheaper and quicker to use filler than the other way.

Close-grained wood is often finished without filler. In the finishing of certain types of oak furniture, such as fumed, weathered, antique, and Jacobean oak, the finisher doesn't use filler.

Filler should be applied (brushed or sprayed) lengthwise of the grain of the wood; then it should be brushed c r o s s w i s e with a rather stubby brush. As soon as it starts to set up flat, start wiping it off crosswise with burlap, manila or horsehair. This crosswise wiping cuts the surplus filler off, leaving the wood pores and crevices well filled. The last operation is to wipe it carefully with the grain with clean burlap or some such material.

One pound of paste filler will cover about 40-sq.ft. of surface, while one gallon of liquid filler will cover from 300 to 400-sq.ft. Success in filling largely depends upon mixing or tempering the filler with proper thinner liquids. Some fillers are hard to mix and are very difficult to use, but when a finisher becomes accustomed to

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Case History No. 9

The electrical industry expressed the need for a clear, air drying coating to have high dielectric strength under excessive moisture conditions.

Experimental samples were tested for moisture resistance by coating square wood blocks and subjecting them to high humidity for long time intervals. Weight readings indicated the moisture resistance of the various films.

The coatings were then tested for their dielectric strength and power factor loss. Thus by the slow process of elimination the formula was perfected. It is absolutely satisfactory and large quantities of this coating are now being used.

Although the coating is used mainly in the clear, it may also be made in colors, for application by brush, spray or dip.

Manufacturers of armatures, coils, motors, conductors and other electrical apparatus interested in this problem, or in the solution of a specific problem of their own, are invited to write, furnishing all details, to—INDUSTRIAL RESEARCH, DIVISION OF WIPE-ON CORPORATION, 105 HUDSON STREET, NEW YORK. A complimentary copy of "Case Histories" will be sent covering this problem and others, such as, non-discoloring white metal finishes; burnproof enamels; two-tone finishes; eyelet coatings; 10 minute air dry metal finishes; magnesium alloy finishes; airplane finishes and seam compound; and coatings to resist alkali, alcohol and acids, together with a solution of your individual problem. —Adv.

using a certain kind of material, it works easier and does much better work.

The typical filler used by house painters is generally tempered to save time. It contains very little oil and it sets flat ready to wipe in two to five minutes. It sets so hard in 30 minutes, usually, that it can not be wiped off. The furniture finisher tempers this filler so it sets ready to wipe in 15 or 20 minutes, yet it can be wiped any time up to within one hour or two after brushing. After being w i p e d down, fillers are ready to finish when they have dried 8 to 12 hours, according to w e a t h e r conditions.—A. DEAN LANG.

Stirs Paint in Laboratories

A 12-page catalog that illustrates and describes an economical and satisfactory line of labor-saving stirrers suitable for mixing and stirring small batches of finishing materials has been published by The Chemical Rubber Co., 1900 W. 112th St., Cleveland, Ohio. These stirrers are equipped with rheostats to produce variable speed, have spark-proof motors, extension cords that plug into electric-light sockets, monel metal propellers and shafts, and are adjustable for position in the container.

Safety Goggle Chart

A chart which specifies types of safety goggles to wear for protection against eye hazards in all principal industries has just been completed by the Safety Engineering division of American Optical Co., Southbridge, Mass. Upon request, it will be sent to any industrial concern without cost.

Probably the most concise and complete chart of its kind, it classifies eye hazardous operations by industries and recommends specific types of eye protection equipment which have been developed for each hazard.

The chart was designed to aid industry select the proper safety equipment needed in the fight to reduce the annual 200,000 industrial eye injuries.

Industrial Safety Catalog

A new illustrated catalog of goggles, respirators, masks, helmets and related articles in the safety line has just been published by Willson Products, Inc., Reading, Pa. The book contains 34 pages of coated paper bound in a 3-color heavy paper binder. Products listed alphabetically include everything from Abrasive Blasting Helmets to Willson-Weld Glass.

Eye Protection for Workers

"How to Fit Eye-Protection Goggles to Workers for greatest Comfort and Safety," is the self-explanatory title of an illustrated bulletin issued by American Optical Co., Southbridge, Mass. A copy will be sent to any industrial concern upon request. One section is devoted to instructions for fitting eye-cup goggles; the other is for the spectacle type of goggles. These sections can be posted on bulletin boards for ready reference as they are made out of heavy, durable paper.

Maximum protection and comfort will be afforded workers if the simple instructions listed in the pamphlet are carried out faithfully.

Fluorescent Paint at Golden Gate International Exposition

Research in connection with the illumination of the Golden Gate International Exposition in 1939 promises new versatility in lighting equipment, especially in the technique of applying "black light" to fluorescent paint for effects of movement and high vitality of color.

High cost of lighting elements, and necessity of frequently renewing the fluorescing paint, have restrained the outdoor use of this spectacular illumination treatment. Five different paint companies, however, are at work on the problem and have submitted hundreds of samples, which are exposed to the weather on a General Electric roof in Schenectady, N. Y.

Periodical tests have disclosed that certain of these samples remain 70% efficient after 60 days of exposure. Renewal would be required only three or four times in the 288 days of the Western World's Fair on San Francisco Bay, so the fluorescent reaction will be used on a large scale.

Lighting will be supplied by glass tubes, their inside surface coated with chemicals that retain all rays except the ultra-violet "black" light. This spectacular lighting device will be used in 16 architectural niches in the Court of the Seven Seas on Treasure Island; in huge outdoor murals and sculptured reliefs, and on interior relief maps and displays.

Cleans Off Old Paint and Rust

The Aurand cleaning tool is a portable electrically-driven hand tool for quickly removing paint and rust from metal, concrete, brick and other hard surfaces. Two cutter bundles similar to those in a grinding wheel dresser contain loosely mounted hardened cutters which are revolved at high speed. Centrifugal force causes the cutters to be thrown outward and to strike and impinge the surface with an effective result. This action thoroughly cleans the surface without injury, as the cutter contact is regulated by an easily adjusted depth shoe. The entire surface and structure is cleaned in a uniform manner.

Surfaces are quickly cleaned of all rust, scale, old paint and foreign accumulations, and left in perfect condition for receiving new paint. The electric tool is equipped with a specially-wound motor designed for this particular application and to insure long life. Universal motors are used which are equally efficient on A.C. or D.C., providing easy connection of the tool on operations anywhere. This cleaning tool is a product of the Aurand Mfg. & Equip. Co., 2643 Colerain Ave., Cincinnati, Ohio.

Classified Advertising

Rate: 45 cents per line per insertion—minimum $1.35

MAN WANTED.

We want a man with laboratory experience to sell lacquers and synthetics in Eastern Indiana and Western Ohio. Previous sales experience not necessary. To the right man, salary, expenses and bonus. Address IF-700, care Industrial Finishing.

INSTRUCTION.

Evening classes in Philadelphia in Paints, Resins, Metals and Industrial Processes. Elementary and advanced courses by mail. DR. BROWN, Industrial Consultants, 3404-C Baring st., Philadelphia, Pa.

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